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A MANUAL OF
GYNÆCOLOGICAL PRACTICE

DAVIS' MANUAL OF PRACTICAL OBSTETRICS.

150 Illustrations, including Several Plates.

By EDWARD P. DAVIS, A.M., M.D., Clinical Lecturer on Obstetrics in the Jefferson Medical College, Professor of Obstetrics and Diseases of Children in the Philadelphia Polyclinic, Visiting Obstetrician to the Philadelphia Hospital, Physician to the Children's Department of the Howard Hospital, Member of the American Gynæcological Society. Second Edition. 12mo. 351 pages. Cloth, \$2.50.

"This manual is, unlike many of its class, not a mere compilation, but contains a number of practical hints not usually found in larger works. The chapters on the diagnosis of pregnancy, the treatment of normal and premature labor, operative obstetrics, the puerperal state, and post-partum hemorrhage commend themselves especially by their clearness and conciseness. We are glad to see that the writer is a believer in episiotomy, and find on page 81 the only intelligent description of that useful operation which we remember having read. If the advice given in Chapter VI, on the examination of patients before the beginning of labor, were generally followed, there would be an immense difference in the maternal and foetal mortality. Obstetrics will never make any progress in this country until the general practitioner learns to recognize abnormalities before it is too late to save the patient. The chapter on the laceration of the perineum and pelvic floor is a useful one. The style is clear and concise, the illustrations helpful; in fact, the work is one which deserves, and will obtain, a wide circulation."—*The Medical Record*.

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A MANUAL OF
GYNÆCOLOGICAL PRACTICE

FOR STUDENTS AND PRACTITIONERS

BY

DR. A. DÜHRSEN

PRIVAT DOCENT IN MIDWIFERY AND GYNÆCOLOGY IN THE
UNIVERSITY OF BERLIN

TRANSLATED AND EDITED FROM THE FOURTH GERMAN EDITION

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WITH 120 ILLUSTRATIONS

PHILADELPHIA
P. BLAKISTON, SON & CO.
1012 WALNUT STREET

1895

10295-

TRANSLATORS' PREFACE

THIS translation of the Fourth Edition of the deservedly popular manual of Dr. Dührssen will be found, we hope, to be a useful addition to professional literature.

The manual is concise ; scarcely a word is without its value. At the same time it forms a clear and safe guide to the knowledge of all the purely gynæcological diseases, and deals very fully with details of the examination of patients, the preparation for operations, and the operative measures in more general use. Much of this is, of course, coloured by the 'individuality of modern German thought and method.

The translators believe this will prove of distinct advantage. It gives a freshness to otherwise well-worn subjects, and every now and then points will be found noticed by the author that are usually neglected in English text-books. As examples of this, the translators may refer to the sections on (1) Disinfection of instruments ; (2) Elephantiasis vulvæ ; (3) Gynatresia ; (4) the use of the continuous current in Dysmenorrhœa with Stenosis ; (5) Vaginal cœliotomy or laparotomy ; (6) the vaginal operation for fixation of the uterus ; (7) the technique of vaginal extirpation ; (8) the use of the faradic current in

coccygodynia ; (9) the flap-splitting method applied to Emmet's operation ; and (10) Küstner's operation for inversion of the uterus. Some of the illustrations are of special value, notably Figs. 57, 58, 113, and 117.

Wherever it appeared necessary, the text has been copiously supplemented by original notes.

JOHN W. TAYLOR.

FREDERICK EDGE.

February 1895.

PREFACE TO THE FOURTH EDITION

THE Fourth Edition is increased by three sheets and sixteen illustrations. A great portion of the increase is due to the author's description of his vaginal method of operating for retroflexion of the uterus and of vaginal laparotomy or cœliotomy.

The first method is at present so far completed that the author is in a position to cure permanently and without danger any retroflexion by this means, even a fixed one. In view of the success of this operation, and that attempts have been made to contest the author's priority, the latter may be permitted to remind his readers that he was the first to publish over forty successful cases, in which he sutured the body of the uterus to the anterior vaginal wall, after opening the anterior vaginal vault. This may be found in the Second Edition of this book published in 1892. The author was also the first to point out that, for the permanent cure of retroflexion, suture of the fundus is necessary, and for the complete prevention of relapses, the opening of the peritoneal cavity; facts which are now generally recognised (*Centrallblatt für Gyn.*, 1892, sec. 924, and *Aerztlicher Praktiker*, 1893, No. 51).

At the same time the author desires to point out that

the idea of this operation was introduced by Säger, but later was discarded by him as not attaining its object. With vaginal cœliotomy, at any rate, the author believes that he has introduced a new and important operation, because this operation will tend to limit ventral laparotomy.

It is especially of value for the vaginal extirpation of small myomata, because it is without danger, and the uterus and adnexa are preserved—it will undoubtedly lessen in the future the indication for operations involving the removal of these organs. The following other operations have been accepted in this edition: Vuillet's operation for curing stenosis of the internal os, wedge-shaped excision of the anterior cervical lip in metritis (author), the uretero-vaginal plastic operation of the author, Küstner's operation for curing inversion of the uterus, Martin's abdominal extirpation of the uterus for myomata, and Péan's uterine castration. Together with these operative methods, massage and ichthyol treatment have found their deserved appreciation.

It is a primary and most important need of the practical physician to be able to establish a correct diagnosis without complicated aids, and whenever possible without anæsthesia. All my pupils assure me that this aim is attained with unexpected facility by the method of examination of Thure Brandt, which I have taught them, and which is even yet much less known and appreciated than it deserves. May this edition also lead to its wider diffusion.

Dr. A. DÜHRSEN.

BERLIN, *December* 1894.

PREFACE TO THE FIRST EDITION

THIS gynæcological manual was due to the incitation of my honoured teacher and chief, Professor Doctor Gusserow.

Its aim is to supply the student with a compressed sketch of the whole subject of gynæcology, in order to make his hospital work fruitful. Professor Gusserow often took occasion to *blame* the growing desire to learn everything clinically. For profitable attendance in the wards of a Hospital some theoretical fore-knowledge is necessary, and there is hardly time for the student to collect this from the larger text-books. But when the student has already some previous knowledge of his subject, then the cases which he sees during his hospital work will stimulate him to increase his information by the study of these more extensive works. The author believes that he has met a want of the practitioner in giving detailed descriptions of the smaller operations, the technicalities, and the method of assisting at the common gynæcological operations.

With regard to this latter point, it has specially struck the author both in operations requiring assistance and in the courses of gynæcological operations which he has held, how little at home were most practitioners in the art of professional assistance, and this point appears to

the author to have been too little noticed. It is not every gynæcologist who is in the position always to command skilled aid, and yet the perfection of the operation depends as much on correct assistance as on the operator himself. On these grounds this handbook may meet with special appreciation from my professional brethren who have to take any place as assistants, and specially from those who desire to take active clinical work in a gynæcological clinic.

On account of the small space at my disposal I have not been able to describe every operation, but only such as have been tested in the practice of Dr. Gusserow.

The difficulties which may arise in the major operations have not been mentioned; these belong to the operator for whom a gynæcological manual is necessarily insufficient.

Some of the drawings have been taken from other gynæcological works. With the kind permission of the authors I have borrowed a series of drawings from the *Displacements of the Uterus*, by B. S. Schultze, and from the *New Growths of the Uterus*, by Professor Gusserow. The other drawings have been executed from my designs by the gifted hand of Mr. Eyrich, the artist.

A. DÜHRSEN.

BERLIN, *March* 1891.

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A MANUAL OF GYNÆCOLOGICAL PRACTICE

INTRODUCTION

On Gynæcological Case-taking.

THIS is required to establish the following points:—

1. **History.**—Age: whether married or not: occupation: whether patient has had any family? and whether the children live, and how many? whether there have been miscarriages—how many of these? whether after these any illness followed?

2. **Condition of Menstruation.**—Amount and duration of flow, as well as duration of the interval; kind of bleeding (whether the blood is fluid or clotted); pains connected with menstruation, the time of their onset, and character; dates of first menstruation (puberty) and cessation of menstruation (menopause); variation of menstruation after marriage, after-births or abortions. Exact date of cessation of the last menstruation.

3. **Existence of Discharge.**—Duration, amount and consistence. On the two last points the statements of the patient are usually so vague that one only gains certain information by examination.

4. **Pains.**—Their kind, site, association with certain causes (exertion, defæcation, micturition, coitus, menstruation, etc.), their intensity (whether they make the patient incapable of work or bedridden).

5. **General Health.**—Appetite, digestion, sleep, any disorders of the nervous, digestive, respiratory, and circulatory systems. Previous illnesses (chlorosis, gonorrhœa, syphilis?) Any and what previous medical treatment.

In many cases the patient tells the physician at once the reason of her visit—she complains of flooding, of discharge, of pain: or she names directly her suffering—she says she has a “falling of the womb,” or a swelling in the belly.

In such cases, the physician examines the part complained of.

In women who have been married a long time without having children, it can be taken for granted that the desire for offspring has led to the consultation.

In the unmarried, on the other hand, one often finds that the fear of a possible pregnancy brings them to the physician. They generally make vague and (often without hesitation) the most untruthful statements, especially with regard to the date of the last menstruation, with the one desire that the practitioner may terminate the pregnancy by the passage of the sound.

The Gynæcological Examination and Minor Manipulations.

Examination is usually avoided during menstruation, but when hæmorrhage is abnormal examination may be imperative.

Sub-mucous myomata are sometimes to be felt during menstruation within the os uteri. In cases of continuous hæmorrhage (from abortion or carcinoma) patients do not generally come to be examined. Valuable time is thus frequently lost, because the woman looks upon each loss as menstrual, and therefore awaits its ending.

A suitable position of the patient is of great importance for an exact examination of the sexual organs, and for any associated local treatment.

To obtain this we use the examination couch of G. Veit-Schröder (Fig. 1). In case the physician prefers not to have so striking a piece of furniture in his consulting-room, there are a number of examination tables, of which by far the simplest is that of Auvar. He makes a simple table, 90 cm.¹ high, with two pairs of movable supports, 40 cm.² long (see Figs. 2 and 3). The first position (Fig. 2) is for all lesser manipulations; the second (Fig. 3) is only used for simple examination and for the introduction of Fergusson's speculum.

The first position is the so-called "lithotomy position," in which the patient, with slightly raised head, and legs bent at right angles to the body, so lies that the vulva is close to the free border of the table and perpendicular to this. If the vaginal douche be used, at the moment of sitting down the clothes must be drawn upwards and



FIG. 1.—(After Hofmeier.)

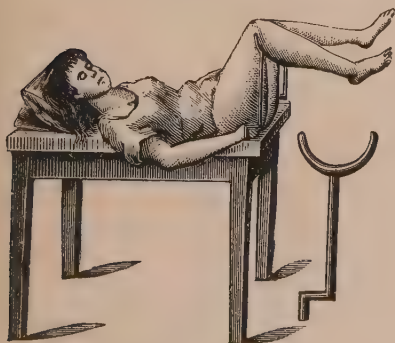


FIG. 2.

backwards, and a pail must be placed under the table into

¹ 90 cm. = 35·5 inches.

² 40 cm. = 15·7 inches.

which there hangs a piece of waterproof sheeting, which is fastened to the table.

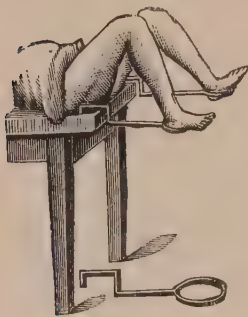


FIG. 3.

Before examination, the bladder must be emptied, when there are tumours of the abdomen, by means of a male catheter. The emptying of the bladder before examination must only be omitted in diseases of the bladder and urethra (gonorrhœal urethritis, *e.g.*).

When the abdomen is greatly enlarged, palpation of its surface is employed at once with both hands (as in the diagnosis of ovarian tumours).

In other cases, after disinfection of the hand, the combined method of examination is carried out unless the disease is directly visible on the outer genitalia directly the glance is directed to these parts (condylomata, inflammation, swelling, prolapse and rupture of perinæum, etc.)

The combined or "bi-manual" examination¹ consists in the introduction of one forefinger, or where this is

¹ [On bi-manual examination:—In following the directions given for the bi-manual and other examinations, it must always be remembered that the patient is supposed to be lying in the lithotomy position at the edge of the table, and the examination is made from the middle line.

In England, examination with the patient lying on the left side is almost universal, and the bi-manual can be made in this position almost as well as when the patient is lying on her back. The patient's clothes are thoroughly loosened at the waist so that the surgeon's left hand can be placed directly on her abdomen: the right forefinger is passed into the vagina, and between the right forefinger in the vagina and the left hand on the abdomen, the uterus and its appendages and any tumour that may be present is thoroughly seized and examined exactly as described in the text.

In this (lateral) position, however, the uterus and any small movable tumour is apt to fall to the left side (on which the patient is lying), and after the chief features of the case have been made out, it will often be found advisable to turn the patient on her back, retaining the finger of the right hand in the vagina, and with the knees drawn up (which, together with the abdomen, may be completely covered by a rug) to complete the bi-manual examination in the dorsal position. This will establish

insufficient, the index and middle fingers, into the vagina, and in the simultaneous palpation of the abdomen with the other hand. The finger inserted must be introduced over the perinæum in order to cause no pain to the sensitive urethral region. While passing the finger through the vagina one estimates its capacity, the dilatability or bulging of its walls (that of the posterior vaginal

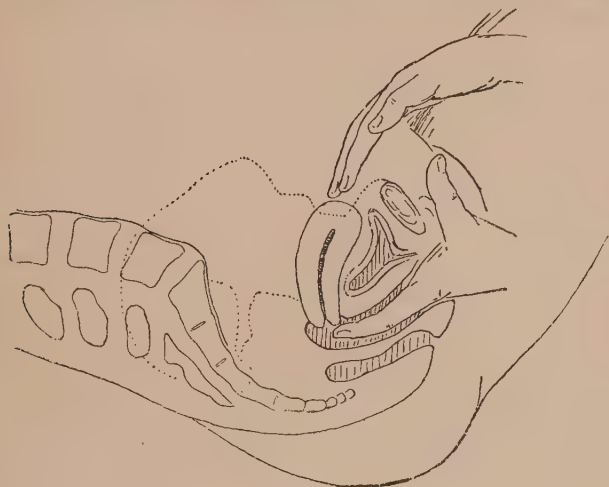


FIG. 4.

wall produced by the overloading of the rectum, that of the vaginal vault through tumours or exudations), the presence of swellings in the vagina itself and their origin.

As the finger passes along the anterior vaginal wall in the exact relations of the pelvic organs and any tumour that may be present.

Note that this corresponds almost exactly to the method of Thure Brandt described in the text, with the important exception that in the latter method the surgeon stands on the left of the patient, palpating the abdomen with his right hand and examining the vagina with his left forefinger. In the English method, the surgeon stands on the patient's right; he palpates the abdomen with the left palm and fingers, and uses his right forefinger for vaginal examination.—J. W. T.]

the middle line, it meets the *portio vaginalis*, that part of the *cervix uteri* which projects into the vagina. With regard to this, one estimates its length, its shape (whether conical or flattened), its direction (normally the under surface of the *portio* looks downwards and backwards and stands in the middle line between the spines of the *ischia*), its consistence—the condition of the *os uteri* and the presence of any swellings. Considerable practice is necessary in the judgment of consistency, striking softness is suggestive of pregnancy. The expert practitioner diagnoses “erosion” from the velvety softness of the parts surrounding the *os uteri*, and swellings (such as follicular hypertrophy and papillary cancer).

These can cause enormous enlargements of the lips of the *portio*; on the other hand, as in carcinoma, they may completely destroy it so that the finger at the top of the vagina enters into an ulcerated cavity. Or the *portio* may be wanting, as in congenital absence of the uterus, or after total extirpation, or spread out (as in *Hæmatometra* and submucous myoma).

At the *os uteri* one estimates its size and shape (a small transverse or circular opening in nulliparæ, broad enough to admit a finger and fissured in multiparæ) whether within it any growths are to be felt (polypi, ovum, or membranes), whether it is lacerated, and if the laceration extends to the vaginal roof.

Now, as the outer hand lies quietly on the abdomen, it presses, with outstretched fingers, the lower part of the abdominal wall gradually inwards toward the pelvis, while the finger within the vagina raises the *portio* somewhat upwards and forwards. By this means the fundus is made to approach the anterior abdominal wall and so to become perceptible to the hand outside the abdomen (Fig. 4).

The latter now, with the finger tips behind the uterus, presses more deeply until the finger within the vagina is brought to the vaginal roof in front of the cervix.

In this way the uterus is seized between both hands,

and these determine its position, size, shape, mobility, connection with the pelvic walls (from peri- or parametritic exudations, or cicatricial adhesions), and its consistence.

As regards the *position of the uterus*, we find that in normal cases the fundus points forwards and upwards toward the upper border of the symphysis pubis ("anteversion"), and that it lies somewhat below the pelvic inlet.

The length of the uterus measures 7-8 cm.,¹ its thickness, 2-4 cm., its breadth at the fundus, $3\frac{1}{2}$ -5 cm., the length of the cervix measures 3-3 $\frac{1}{2}$ cm., the length of the "portio" about 1·8 cm., and the thickness of the uterine walls varies from 1-2 cm.

Owing to the fact that the portio inverts the upper part of the vagina, it appears rather larger than the measurements here given. By practice one is able to determine on palpation whether the uterus is of these measurements or whether it is larger or smaller than normal.



FIG. 5.—The normal position of the uterus in a virgin. (After B. S. Schultze.)

The shape of the uterus is that of a pear with the smaller end directed downwards.

The anterior surface across the body of the uterus is

¹ 7-8 cm.	= 2·8-3·2 inches.
2-4 "	= ·8-1·6 "
$3\frac{1}{2}$ -5 "	= 1·4-2 "
3-3 $\frac{1}{2}$ "	= 1·2-1·4 "
1·8 "	= ·7 inch
1-2 "	= ·4·8 "

flat—the posterior surface convex—(the uterus becomes globular when it holds any physiological or abnormal contents, as in pregnancy, tumours, or Hæmatometra).



FIG. 6.—The normal position of the uterus in a woman who has borne children. (After B. S. Schultze.)

Further, the body of the uterus is bent forwards from the cervix (ante-flexion). The uterus should allow free and painless movement in all directions—upwards and downwards, to either side, and forwards and backwards. In normal cases one should be able with the volsella to draw down the os uteri to the level of the vulva.

If the mobility in a forward direction be limited, and pain is caused by the attempt with both hands to draw

the uterus forward, the latter is probably fixed by posterior adhesions due to peri- or parametritis (Fig. 117).

Striking softness of the uterus suggests pregnancy, circumscribed hardness suggests interstitial myoma, and hardness of the whole organ is found in chronic metritis.

When the uterus has been examined in this way in all directions, one proceeds to notice whether in front of, or behind, or near the uterus, any abnormal peri- or parametritic cords, exudations, or other tumours can be felt, and if so, to define their relations to the uterus, whether approaching the latter with a broad attachment or by a pedicle, whether they have movement independent of the uterus, and whether they displace the uterus and vaginal roof. (For the complete diagnosis, see special Chapters.)

In favourable cases it is possible (without anæsthesia) to feel near the uterus, and passing outward from its lateral corners like thin cords, the Fallopian tubes; while near the side wall of the pelvis the almond-shaped and large almond-sized ovaries may be examined.

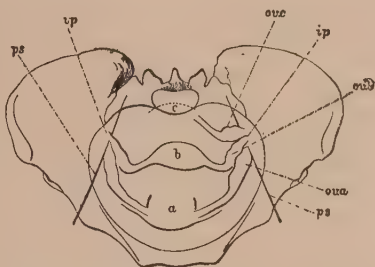


FIG. 7.—The normal position of the ovaries at the edges of the psoas muscles in the different positions of the uterus. (After B. S. Schultze.)

Both structures easily elude the fingers on examination. The right ovary is best examined with the right forefinger introduced into the right side of the vaginal roof, the left ovary with the left forefinger. The hand on the outside of the abdomen must be so deeply pressed in for this as to make it possible for both hands to come near each other. The hands are brought together first immediately at the uterus and then are gradually carried to the sides, examining all structures from the sacrum to the pubis.

In order to succeed with the bi-manual examination the abdominal wall must be lax. The examination is easiest under deep anæsthesia, but without this it is also easy in patients who have borne several children and whose abdominal walls are lax. The tense and thick abdominal walls of virgins or old women make the examination difficult, especially if the patient contract her abdominal muscles.

If muscular contraction occurs from excitement, the practitioner asks the patient to breathe in and out quietly with open mouth, or converses with her. If it arises from pain he must seek throughout to gain his end by very gradual and soft pressures.

When he has palpated the abdomen a little while in this way the contraction usually ceases, or he finds on a

second examination that there is at least less contraction.

In consequence of this one frequently obtains on a second examination quite different and important results. In order to reach as high as possible with the examining finger, it is well to bend the other three fingers into the palm and press the perineum upwards with these.

Usually the beginner does this half-heartedly, and consequently complains that his finger is too short. He is also apt with his outer hand to dig in directly behind the symphysis, and in this way to press the uterus backwards, and therefore to feel nothing from the anterior vaginal vault between his hands.

In virgins the internal examination should generally be made by the rectum in order to save the hymen.

The rectal¹ examination must be made under all circumstances when larger or smaller swellings are felt in the pouch of Douglas.

Lately I have convinced myself that the bi-manual examination after the method of Thure Brandt is easier, and gives us full results on the examination on the examination table.

¹ [On rectal examination :—The part under the free edge of the nail of the right forefinger and the groove at its base is carefully filled with soap, and the whole finger is anointed with oil or vaseline. The finger is then (visibly) introduced within the anus, any pile or fold of skin being protected from unnecessary pressure. (If any fissure or ulcer of the anus be seen, the examination must be omitted or deferred.) On examination through the anterior wall of the rectum the first thing to be recognised is the ball-like projection of the portio. When this has been satisfactorily made out, the uterus is seized between the examining finger in the rectum and the hand on the outside of the abdomen—as in the ordinary “bi-manual”—and the details of pelvic examination carried out as described in the text.

It will be found that the posterior part of the pelvis, behind the uterus, can be more thoroughly explored from the rectum than from the vagina. Hence, rectal examination may sometimes be of special value in the diagnosis of tubal and other tumours which tend to fall behind the uterus. It is important to note that examination per rectum under these conditions must be carried out with the greatest care and gentleness. It is quite possible by careless or clumsy examination to burst a pyosalpinx or tubal pregnancy, and, in this way, cause the death of a patient.—J. W. T.]

For this I use the low couch of Brandt, with the modification that the lower end is made to raise.

The couch of Herr E. Lentz in Berlin, here figured, as used by myself, is 150 cm. long and 60 cm. broad, the centre-piece 50 cm., and the head and foot 70 cm. high.¹

The patient must fully unloose her clothes, so that the hand can be placed freely on the abdomen. Then she lies down on the couch immediately at its edge, with her legs acutely flexed.

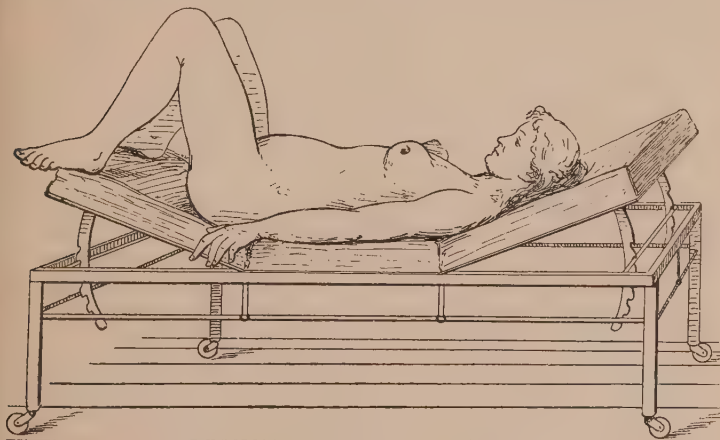


Fig. 8.

The chin is approximated to the breast by a cushion placed under the head, the arms lie outstretched on the couch without any muscular contraction. If in this posture the abdominal walls are not sufficiently relaxed, I draw the patient still lower on the couch, so that the pelvis lies on the ascending inclined plane at the foot (Fig. 8). The left index and middle fingers are now

¹ 150 cm. = 5 feet.
 60 " = 2 "
 50 " = 1 foot 8 in.
 70 " = 2 feet 4 in.

introduced into the vagina underneath the left thigh of the patient.

The advantages of this position, in which we may also carry out the massage treatment of Thure Brandt, lie in the complete relaxation of the abdominal walls, and in the ease with which the palpating right hand moves in all directions, while the finger within the vagina examines equally well the whole pelvic contents, the left forearm of the surgeon being supported by the sloping end of the couch.

Those attending my physicians' and students' course, in which I allow every one to examine the patients, first on the examination table and then on the couch, are always agreeably surprised at the facility with which on the latter they are able to palpate the previously incompletely or not readily felt uterus, and even the ovaries.

The examination by Thure Brandt's method can also be carried out with advantage when the patient is confined to her bed. It is only necessary to take care that the patient lies upon a firm mattress. The position across the bed, as used in midwifery practice, is the most comfortable for examination with the speculum and for therapeutical manipulations.

The Examination with the Speculum.—After the bi-manual examination the practitioner undertakes the inspection of the vagina and cervix with a speculum.

At the vagina he considers the condition of the mucous membrane; the quantity and quality of any retained secretion; the situation and size of any existing fistulæ, ulcerations, or new growths. At the portio, its shape and colour (port wine colour in pregnancy) and the presence here of erosions or new growths.

Within the os uteri he notices a greater or less amount of discharging mucus, either clear or streaked with yellow (in the latter case there is some uterine or cervical catarrh), and after removal of this with a wad of lint, he may view the lowest part of the cervical mucous membrane in patients who have borne children.

After establishing the diagnosis, the speculum further

serves for the carrying out of certain therapeutical treatment.

There are three kinds of specula—the tubular, the grooved or “duck-bill,” and the valvular. Of the tubular specula the author uses that of Fergusson, in three sizes : 15 cm. long, and $2\frac{1}{2}$, 3, and $3\frac{1}{2}$ cm. broad respectively (Fig. 9).¹ These show the Portio quickly, but are too long for the introduction of instruments into the uterus. It is only by very forcibly drawing the speculum backwards that one succeeds in introducing a sound into the cavity of the uterus while the tubular speculum is in position.



Fig. 9.

For the introduction of the speculum the labia are spread open from above by the thumb and index finger of the left hand, the right thumb is placed in the wider end of the speculum, while the other fingers (of the right hand) grasp it from without. The oiled beak (or mouth) of the instrument is then placed on the posterior commissure, the perineum pressed strongly down by this, while the speculum is pushed backwards so far as it can go without resistance.

If the os uteri cannot now be seen without further trouble, light movements of the lip of the speculum will soon bring it into view.

It is only in very marked anteversion of the uterus that it may become impossible to find the “os.”

The tubular specula very easily fall out when not held in position. Pad and douche-tube must on this account be so placed that they can be reached by the right hand.

During withdrawal of the speculum the vaginal walls come into view and can be readily examined.

¹ 15 cm. = 6 inches.

$2\frac{1}{2}$ „ = 1 inch.

3 „ = 1.2 inches.

$3\frac{1}{2}$ „ = 1.4 „

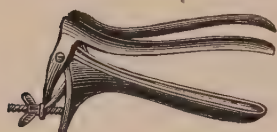


Fig. 10.

The bi-valve speculum, and especially the tri-valve speculum of Nott, much used by the author (Fig. 10), has the advantage that it is peculiarly easy of introduction, and that it is self-retaining. It thereby permits of the carrying out of the minor gynæcological procedures of passing the sound and "curetting" with the greatest ease, even with a very narrow vagina.

The trivalvular speculum of Nott (Fig. 10) which is used by the author, is 10 cm. long, 3 cm. broad, and only $1\frac{1}{2}$ cm. thick.¹ The lower blade is made exactly like that of Simon's speculum; one can therefore rest the curette or sound here comfortably. The two upper blades leave a free space in the middle, so that one can easily raise a volsella fixed in the portio.

The speculum is introduced with its breadth lying in the sagittal plane, then turned about a right angle, and guided as far as possible backwards down to the portio. While the left hand holds the speculum firmly pressed against the pubic arch the screw is turned to the right with the right hand until the portio becomes visible. If the beak of the instrument turns out to be too far forwards, as often happens, the lower blade (when the screw is turned) pushes the portio backwards; on the other hand, if it is too far back, the upper blades may push the portio forwards. In these cases the screw must be turned back, and the beak of the speculum pushed in the opposite direction.

The author can warmly recommend this speculum to the practitioner who has no assistant at his command, and who wishes to expose the whole of the cervix.

Of the grooved or "duck-bill" specula, those of Simon are chiefly used in Germany (Figs. 11 and 12). These draw the vaginal walls farthest apart, take by far the

¹ 10 cm. = 4 inches.

3 „ = 1·2 inch.

1·5 „ = '6 „

least room, with as little rotation as possible they bring into position the most different parts of the vagina and portio, and accommodate themselves to the most varied positions of the portio and vagina. They are therefore indispensable for all operations in the vagina in which sutures are needed. On the other hand, for consulting-room practice they have the disadvantage that one needs an assistant to hold the anterior and posterior blades. Perhaps one may manage without this in the following manner:—The posterior blade is first introduced, the anterior vaginal wall pushed upwards with the left forefinger, and the portio, made visible by this, seized with a volsella, and drawn forwards. The posterior blade of the speculum is usually self-retaining; through the traction on the volsella with the left

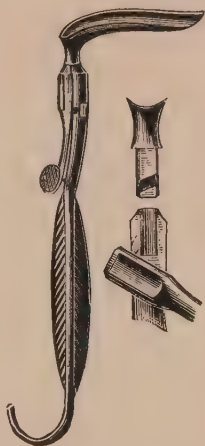


FIG. 11.—Simon's half-circular speculum (posterior blade), with an improved aseptic lock.

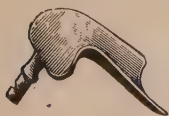


FIG. 12.—Modified half-circular speculum (this is to be preferred in many operations to the original form of Simon).

hand, the portio remains visible; and one has the right hand free for the introduction of instruments. The author uses two posterior blades, $3\frac{1}{4}$ and $3\frac{3}{4}$ cm. broad and $8\frac{1}{2}$ and $10\frac{1}{2}$ cm. long respectively, with one anterior blade $2\frac{1}{2}$ cm. broad and $7\frac{1}{2}$ cm. long.¹ The posterior blade is carried backwards with strong pressure on the perineum to the end of the beak, and then tilted sharply upwards in order that the portio may be

¹ $3\frac{1}{4}$ cm.	= 1·3 inches
$3\frac{3}{4}$ „	= 1·5 „
$8\frac{1}{2}$ „	= 3·4 „
$10\frac{1}{2}$ „	= 4·2 „
$2\frac{1}{2}$ „	= 1 inch
$7\frac{1}{2}$ „	= 3 inches

engaged by the wide *cul-de-sac* of the speculum. The anterior blade is simply introduced as far as possible within the gaping vagina. The anterior and posterior blades must be held so that the ends within the vagina press backwards and upwards and backwards and downwards respectively, because simple traction upwards and downwards will pull them out. During operation the lateral vaginal walls may, if necessary, be held apart with retractors. Should the practitioner not succeed at all in showing the portio with these various specula, he seizes the cervix with a volsella (Fig. 13), and then passes in a Simon's or Nott's speculum over this.¹



FIG. 13. — Volsella, with aseptic lock.

But the drawing down of the cervix should only be practised where there is no danger from the presence of any pus-collections (Pyosalpinx) in the neighbourhood of the uterus, otherwise the abscess-sac might burst and produce fatal peritonitis or internal hæmorrhage. On this account—I repeat it once again—the combined examination should always precede the instrumental examination.

The volsella is introduced over the palmar surface of the left forefinger which is inserted in the vagina, so that its tip lies against the os uteri. When it reaches this point, the practitioner slightly depresses the volsella, and

¹ [On the use of the speculum:—The necessity for the use of specula diminishes as experience increases. Erosions, mucous polypi, retention-cysts, lacerations, and new growths of the cervix should be detected by the finger rather than by sight. In most cases digital examination will give a truer estimate of the nature and extent of the disease than can be gained by the use of the speculum. Many surgeons confine themselves to the occasional use of the "duck-bill" speculum of Sims or Simon, only employing this for diagnostic purposes in order (1) to confirm what has already been found by touch, (2) to examine the colour of high discharges, or (3) to search for small fistulous openings, either acquired or congenital.—J. W. T.]

opens it to about the thickness of the portio more or less, he then pushes it about half a centimetre higher, so that the under blade lies within the cervical canal, while the upper blade lies on the outside of the anterior lip, and then closes the instrument again (Fig. 14).

This manipulation needs an antecedent vaginal injection of 3 per cent carbolic, or 1 per cent of lysol, or 1 in 5000 sublimate solution. On the other hand, if the portio is seized first in the speculum it is sufficient to give the



FIG. 14.

former a swabbing with a wool pad dipped in 1 to 1000 sublimate, or 1 per cent lysol¹ solution before inserting the volsella.

¹ [On lysol:—This antiseptic, which will be found frequently recommended in the text, is the saponified product of coal-tar and chiefly composed of the cresols. It is stated to be superior as a microbicide to carbolic acid, creolin, cresyl, and other analogous coal-tar products (Cadéac and Guinard). It is sold in commerce as a dark brown liquid which is freely soluble in either hot or cold water. It is necessary to use soft or distilled water in order to obtain a perfectly clear solution. Hard water (owing to lime-salts) makes the solution turbid. This, however, has no effect on its therapeutical value. It is "readily soluble, reasonably active, and very cheap" (Squibb's *Ephemeris*, February 1893).—F. E.]

The fixation of the cervix with a volsella greatly facilitates the introduction of all instruments within the uterus, although this may be carried out under guidance of the finger or through a speculum. After fixation, the uterus cannot become pushed away by the instrument, and ante-flexion of the uterus becomes lessened—the attainment of both of these objects is necessary in many cases before the complete introduction of instruments through the cervical canal can be effected.



FIG. 15.

Formerly the most common reason for the introduction of an instrument was the sounding of the uterus in order to establish its length and size, and the capacity and direction of its cavity. These problems are solved to-day, for the most part, by the bi-manual examination only. Whenever the practitioner wishes to pass the sound or to introduce any special instrument within the uterus he must be very careful to ensure asepsis of his finger, of the instrument, and of the vagina, at all events if he introduce the instrument under guidance of the finger.

Introduction of the sound under guidance of the finger.—The vagina is washed out with an antiseptic solution, the disinfected left forefinger inserted within it and placed against the os uteri, while the sound, which has been kept in a solution of 3 per cent of carbolic acid, or 1 per cent of lysol, is taken straight from this and directly introduced into the vagina. The sound is glided along over the palmar side of the forefinger into the os uteri, and then by lowering the handle it is still further pressed forwards.

If any resistance is found here, the sound must be gently pressed forwards in various directions without any violence. When the sound has been introduced about 3 cm. within the external "os," a little difficulty

is often met with at the internal "os." This one endeavours to overcome by lowering the handle of the sound.

When it is found that the sound will not pass, but pushes the uterus before it, it is best to fix the portio with a volsella, and let an assistant hold this while the sound is passed once again as already described.

If there is no assistant, a Simon's or Nott's speculum must be introduced. In this case the left hand holds the volsella, while the right hand carries the sound, and the practitioner visibly introduces it as far as possible within the cervix. He now places the tip of the right forefinger (or the tip of the left when passing the sound without a speculum), on that part of the sound which rests against the os uteri, and withdraws finger and sound together without removing the finger from its position.

In this way the practitioner measures the length of the cavity of the uterus. The *direction* he can estimate by noticing whether the point of the sound passes forwards or backwards or to either side, its *capacity* by the varying ease with which the sound can be moved within the uterine cavity, and the *thickness of its walls* by palpation of the point of the sound from without the abdomen. When the tubes are abnormally dilated, the sound may pass into these; when the walls of the uterus are weak and thin, it may perforate them.

Under both of these circumstances the sound passes much farther than the distance corresponding to the size of the uterus as diagnosed by the bi-manual examination, in the latter case the practitioner may also feel the point of the sound just beneath the abdominal wall. If the sounding has taken place under full antiseptic precautions the perforation will do no harm, provided that one does not inject any caustic afterwards. The most practised hand may perforate the softened uterine wall—one can only

throw blame on the examiner who does not notice the perforation.

The Fritsch Bozemann uterus catheter (Fig. 16) for washing out the uterus, Braune's syringe (Fig. 17) for the injection of medicated fluids, Playfair's wool-covered probe for caustics (Fig. 21), hollow or solid dilators for dilatation of the uterus, a thin strip of iodoform gauze held between long anatomical pincettes for dilatation of the uterus, or for the stopping of hæmorrhage, and the curette for scraping out the cavity of the uterus, are all introduced according to the principles just described. This may, however, be most conveniently done through a Simon's or Nott's speculum after fixation of the portio with a volsella.



FIG. 16.

Washing out of the uterus, which should always be preceded by radical disinfection of the vagina, is used before every operation on the uterus, and also in cases where decomposing contents, which cannot be entirely removed by curetting only, are retained within the uterine cavity.



FIG. 17.

In this case the practitioner uses a 3-5 per cent carbolic solution, or a 1 per cent solution of lysol.

After the washing out, the author finishes the operation with a tamponade of the uterus after the method of Fritsch, using iodoform gauze dipped in iodoform-glycerine. This seems to me to be the most convenient method of permanent drainage, as the iodoform makes the decomposing secretions harmless at the moment of their origin, and the gauze facilitates direct outward drainage. If the cavity of the uterus is sufficiently open I push in the gauze

quite to the fundus of the uterus with an anatomical pincette of 30 cm. in length (Fig. 18), and then gradually fill the whole uterus from within outwards. In other cases I place the gauze at first only in the os uteri, and then, with a moderately firm sound, or better still, with the grooved sound of Asch, push this further in. If the cavity of the uterus has been plugged on account of hæmorrhage, the vagina must afterwards be filled also, and best with absorbent salicyl wool.

If the tamponade must be made without a speculum the anterior cervical lip is seized with the volsella, under guidance of the forefinger, the portio is drawn down to the vulva, and then the tamponade is made.

In case the portio will not come down so low, the volsella are handed over to an assistant, strips of gauze are guided over the left forefinger by means of the long pincette into the os uteri, and the tamponade is finished as already described. If no assistant be at hand, the simplest way is to hold the box of material for tamponading between the knees. FIG. 18.



FIG. 19.



FIG. 20.

The vaginal tamponade is made most surely by

means of Simon's speculum. First the posterior and then the anterior vaginal vault is securely filled by salicyl wool tampons, and others are then pressed against the os uteri. The lower third of the vagina is left comparatively free, as otherwise severe pains and retention of urine may be caused. The long pincette serves for introduction. If there is no severe hæmorrhage at the time, the vagina is filled with iodoform gauze, well disinfected, and the patient allowed to remove this herself after twenty-four hours. If no speculum is at hand, the tamponade is carried out as follows: The posterior vaginal wall is depressed with the fore and perhaps middle fingers of the left hand, and upon these fingers as a speculum the first tampon is placed in the posterior fornix with the right forefinger or a pair of forceps. In order to carry the tampon so far it is sometimes necessary to remove the right forefinger and to push up the tampon with the left fingers into the vaginal vault. Just as strict precautionary antiseptic measures are required for the carrying out of the various methods of tamponade as for operations on the uterus. Before tamponading the external genitals, the vagina and finally the uterus should be disinfected. The author recommends the 1 per cent solution of lysol as the disinfectant. This has the advantage that it lubricates the genital canal, and therefore the tamponade is done more easily after its use.

After full disinfection the bladder is emptied with a catheter. In case of fœcal accumulation within the rectum the latter should have been previously cleared out with an enema.

The hands, instruments, and tamponading material must be aseptic and germ free. The materials must be impregnated with an antiseptic in order to prevent the development of germs already normally present in the genital tract, and in this way to hinder the decomposition of the secretions soaking the plugs. A simply aseptic plug becomes foul within a few hours, but plugs of iodoform

gauze and salicylic wool can be left in several days without giving off an offensive odour on removal. At the same time the material impregnated with antiseptics must be sterilised with a current of steam in order to destroy any germs still in it. The author has recently caused the material for these various methods of tamponade to be manufactured ready for use. The material is packed up in metal-foil covered packages, which are sterilised in a jet of steam and then hermetically closed.

The case "No. 2" contains 1 grm. (15 grs.) of iodoform powder, two strips of iodoform gauze, 5 m. long (5·5 yards), and 10 cm. (4 in.) and 3 cm. ($1\frac{1}{4}$ in.) broad, and 20 grms. (5 drachms) of salicyl wool.

With this case, which, together with cases 1 and 3 (Figs. 19 and 20), are found of great use in obstetric practice, the methods of tamponade already mentioned may be conveniently carried out. The gynæcologist can therefore prescribe these cases as suitable for use after operations.

Any surplus material can be used up as an outside pad.

The case No. 3 is filled with sterilised salicyl-wool tampons.

Cauterisation of the uterine mucous membrane.—The author prefers to carry this out by means of a Playfair's probe, surmounted with wool. This instrument, drawn out at the point and roughened on its side, after Fritsch (Fig. 21), and covered very lightly with salicyl wool, is passed within the uterus, and the latter wiped out with it. Now a fresh little probe is dipped in the caustic and quickly introduced into the uterine cavity. If this is done slowly, the internal os contracts and the full entrance of the probe within the uterus is rendered impossible. Both before and after the application of the Playfair's sound it is best to wash out the uterus with an antiseptic solution.



FIG. 21.

After the removal of the little probe covered with caustic, a strip of iodoform gauze, or a wool tampon dipped in iodoform-glycerine and provided with a string, is placed against the portio, in order to protect the vagina from any out-trickling drop of caustic.

This cauterisation, and especially the injection of caustics, very often gives rise to considerable uterine colic, a sign that the uterus itself is firmly contracting. The pain may be avoided by the use of narcotics.



FIG. 22.

After the cauterisation blackish shreds or coagula frequently come away, a circumstance respecting which it is well to forewarn the patient.

These cautery-sloughs must be removed from the vagina as quickly as possible in order not to give rise to serious decomposition.

Their removal is effected by the *antiseptic washing out of the vagina*. The author does not order sublimate now for this purpose, but a $\frac{1}{2}$ per cent lysol solution exclusively. The original flask forms a measure-glass as well. Vaginal douches are used in the recumbent position. Should large quantities of water (4 litres and upwards) be made use of for metritis, para-, and perimetritis, the amount of water concerned, having a temperature of 30-40° R. (100-120° F.) (beyond 35° (100° F.)

it is termed a hot douche) is poured into a clean vessel, from which a syphon hangs (Fig. 22).

The vessel is placed 1 m. (40 in.) above the bed, while the patient lies on a bed-pan (previously filled with water), which is furnished with an overflow pipe that hangs into a bucket.

The patient begins the douche, and immediately a continuous stream of water is started between the vessel already mentioned and the bucket that is standing under the bed. This stream of water flows altogether into the bucket.

If the patient has no bed-pan the douching can take place on the corner of the bed.

These methods avoid the repeated filling of the irrigator with water and also the frequent emptying of the bed-pan. The patient can also manage easily without an assistant.

In order to stretch the vagina the patient must close the vulva with one hand, and only from time to time allow the injection to pass out.

Syphon and glass tube must be kept very clean, and placed from time to time in a solution of sublimate (1:1000).

The douche is ordinarily used both morning and evening. After each injection the patient must rest for at least an hour.

Dilatation of the Uterus.—The author gives the preference either to the method of dilatation with solid metal dilators or to dilatation by means of the uterus-tamponade with iodoform gauze: the former in cases where the patient is anæsthetised; the latter in all other cases. Of the many varied dilators in the market the author uses those of Fritsch in twelve sizes; the largest being of the thickness of a finger. These are reckoned, under anæsthesia, within a few minutes to produce such dilatation of the cervix that the finger can be introduced within the uterine cavity. The dilatation is preceded and followed by a uterine injection.

A continuous firm tamponade of the uterus produces

(as Vulliet has shown) such a gradual dilatation of the cervix that the finger can be introduced.¹ The tampon remains for 48 hours. If the cervix is firmly closed a course of 6-8 tampons is necessary, the dilatation occupying from 15 to 20 days.

On the other hand, if the cervix be already somewhat open, as is often the case when some intra-uterine tumour is present, the author has found in 24 hours sufficient dilatation for the passage of his finger.

This method has a curative effect in addition to its use for exploration. The uterus becomes expanded and excited to contraction.

The entrance of the finger through the cervix is assisted by grasping both lips with volsella. With traction on these the cervix (like the finger of a glove) is drawn over the entering finger.

Pressure on the fundus by a hand on the outside of the abdomen still further helps this manœuvre.

Dilatation may be carried on by means of tents. These, however, must be most carefully disinfected before use.

Perforated laminaria tents become aseptic and flexible by preservation in a 1 per cent solution of sublimate in alcohol, or by keeping for 14 days in a 10 per cent solution of iodoform in ether.

The practitioner introduces the tent by means of the anatomical pincette; the end of the tent must lie "flush" with the external "os," and a pad of iodoform gauze should be applied immediately below this. The tent remains in position for 24 hours.

Under certain circumstances the three methods here described may be combined. The second method (that of Vulliet) has the advantage that it can be carried out while the patient is walking about.

The instrumentarium which the practitioner needs

¹ Not in all cases (Author).

for examination purposes is fairly simple. The following instruments are necessary:—¹

- 3 Fergusson's specula.
- 1 Nott's speculum.
- 2 Simon's specula.
- 1-2 volsella.
- 1 uterine sound.
- 2 Playfair's probes.
- 2 wad-holders (Fig. 23).
- 1 glass vagina tube.
- 1 small-sized Fritsch-Bozemann catheter.
- 1 long anatomical pincette.
- 1 Cowper's scissors.
- 1 male catheter.
- 1 Asch's tampon-carrier.

With the exception of the Fergusson's specula and the vaginal tubes all the instruments are best made of metal.

Besides these, the practitioner will need salicyl-wool and 5-10 per cent iodoform gauze—the latter cut into narrow and broad strips for the tamponade of uterus and vagina, must be packed in cases which, after exposure to steam, are her-



FIG. 23.

¹ [On the examination-instruments:—This list may be reduced as follows:—

- | | |
|---------------------------------|-------------------|
| 1 Sims' ("Duck-bill") speculum. | 1 surgical probe. |
| 1 uterine sound. | 1 volsella. |
| 3 wad-holders. | 1 glass-catheter. |
| 3 Playfair's probes. | 1 tape-measure. |

To these should be added the following instruments and accessories which are used in minor surgical treatment:—

- | | |
|-----------------------------|------------------------|
| 1 scissors. | China bowls and basin. |
| 2 pairs of catch-forceps. | Drainage-tubing. |
| 1 lancet, or sharp scalpel. | Iodoform gauze. |
| Absorbent wool. | Antiseptic soap. |
| "Strapping." | Hand-brush. |
| Safety-pins. | |

(The use of boiling water for immediate sterilisation of instruments and repeated disinfection of the hands form the best guides to aseptic practice in the consulting-room.)—J. W. T.]

metically closed. These cases (Fig. 24), which the author formerly prepared himself, can now be ordered from the apothecary or instrument maker, and may be conveniently used in practice without any danger of contamination.



FIG. 24.—Case for sterilising dressings, also suitable for midwifery practice. By means of the two lids, the case can either be made air-tight or opened up to the action of steam.

Further, two irrigators with syphon and glass tube are necessary; the one for warm sublimate solution (1:5000), the other for warm carbolic (3 per cent). One pan is needed with the same carbolic solution for the keeping of the instruments, one pan with sublimate solution (1:1000) for disinfection of the hands, one pan with simple boiling water or a wash-hand basin for soaping and brushing the hands.

The practitioner must keep in stock carbolic acid, sublimate, tincture of iodine, chloride of zinc, acetic acid, iodoform, and glycerine, and some carbolic oil or carbolised vaseline for oiling the specula.

The above-named instruments lie best dry, in a glass tray which stands at an easy distance on a little table close to the examination couch.

The instruments which are needed are placed in carbolic solution, as well as the glass tube of the irrigator. The practitioner must be able to reach the pan containing these from his seat. On the little table I place a basin as well. This receives the soiled instruments.

Herr Lentz, the well-known locksmith, has manufactured after my instructions a handy table made of iron and glass, with special irrigator and holder for the vaginal tube and uterus-catheter.

If an instrument be used, it must be first cleaned with soap and brush before it is replaced in the carbolic solution. The tubular specula must be wiped out with wool and laid in a 1 in 1000 sublimate solution.

When there are dirty discharges, the instruments which have been used must be thoroughly boiled or properly sterilised. Whenever the surgeon sterilises his instruments for the major operations, he should also sterilise the instruments in daily use.

The necessity for a thorough disinfection at the first

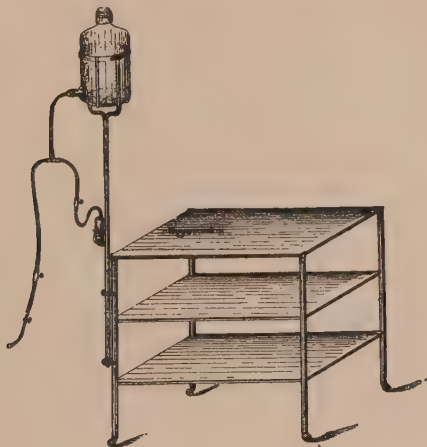


FIG. 25.

examination is self-evident. Each succeeding examination should be preceded by a quick washing of the hands in soap and warm water, and by a brushing in a 0·1 per cent solution of sublimate, so that the surgeon may not infect the patient with any septic matter by means of the various therapeutic measures he may undertake, or carry gonorrhœal infection from one patient to another. The whole anti-septic apparatus is essentially very much simplified by the use of lysol. The practitioner then only uses one irrigator and one pan, both containing $\frac{1}{2}$ - 1 per cent of solution; the latter for the preservation of the instruments and for the disinfection of the hands.

The Disinfection of Instruments and Accessories.

The instruments, which should be plated, solidly soldered, and made entirely of metal, must be sterilised before every operation, however small. The practitioner has choice of two methods—the boiling and the hot air methods of sterilisation. Boiling the instruments is the quicker and more simple method. It can be carried out in the patient's house, all that is required being a fairly large saucepan, boiler, or kettle with a closable lid, in which the instruments, covered with water, are boiled for five to fifteen minutes. By tying the instruments in a towel one can lift them out of the boiling water or turn them over, even in a small kettle. After boiling, the towel with its enclosed instruments is placed in a 1 per cent solution of lysol. By this method the instruments soon become spotted, and the knives and needles blunted even from a single boiling. These disadvantages may be partly avoided by boiling in a 1 per cent solution of soda. If the instruments are boiled immediately after operation they must be brushed first with soap and warm water.

The second method leaves the instruments quite unaltered. It has in addition the advantage that the surgeon can sterilise his instruments at home in a metal case or a suitable asbestos¹ pouch, and they are then ready for use. The lid of the metal case, which should be removable, serves as an aseptic instrument tray. The disadvantage of this method is that one requires one's own sterilisator, which consumes a considerable amount of gas. The apparatus is not absolutely necessary. The baking oven of the kitchen-range easily reaches a temperature of 150° C. (302° F.) and more, a point which my friend Dr. Hünemann has noted. A thermometer graduated to high degrees is all that is necessary to avoid a rise above 170°

¹ These are made by Messrs. Schmidt and Engmann from the author's descriptions.

C. (338° F.), as by higher temperatures the blades of the scalpels are affected.

It is sufficient for practical purposes to sterilise for one hour at a temperature of 150° C. (302° F.). For hot air sterilisation, the apparatus of Lautenschläger has served me well. The temperature of the whole interior is a constant one in contrast with that of other apparatus where the heating is from the bottom. The apparatus is fitted with a suitable thermo-regulator (Fig. 26). When the thermometer stands at 170° C., the temperature in the

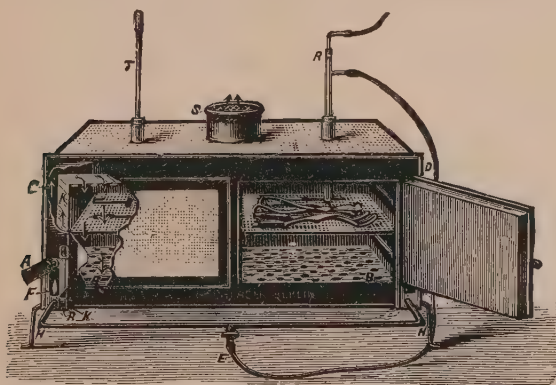


FIG. 26.

vicinity of the instruments is 10° - 20° lower. These variations should be estimated by means of a maximum thermometer placed among the instruments. In this apparatus catgut and sponges can be dried and sterilised. They will bear 150° C. of heat for one or two hours without injury if they have been well dried for half an hour at 80° C. previously. Benckiser and Döderlein demonstrated this. This method has the advantage of great simplicity, and in addition, sponges and catgut are much more easily carried about when dry. I sterilise my sponges in a tin box (s, Fig. 30), and the catgut after Benckiser's method in envelopes which are then closed.

Immediately before use the sponges are placed in a 3 per cent solution of carbolic acid, or a $\frac{1}{4}$ per cent solution of lysol, or 0.6 per cent solution of common salt; the catgut is laid for a little while in one of these solutions.

Another way of sterilising catgut is that of Bergmann, which is worthy of recommendation: The catgut is placed in ether for 24-48 hours to remove its fat, and it is then kept in a solution of 1 gramme (15 grains) of sublimate in 80 grammes (2.5 ounces) absolute alcohol and 20 grammes (5 drachms) of water.

The silk can be boiled with the instruments before use, or it can be rolled on glass plates or spools and boiled at home, and preserved in a 0.1 per cent solution of corrosive sublimate, or a 5.0 per cent solution of carbolic acid.

Silk can also be sterilised by the steam method. For this purpose it is placed in a tin case, which also facilitates its carriage.

All the other articles used, the dressings and binder, the drain tubes and rubber tubing, the operating apron (cloak)—(if lint compresses are used instead of sponges these are included), the mackintosh and sheeting must be sterilised for half an hour in the steam current. For this also the author

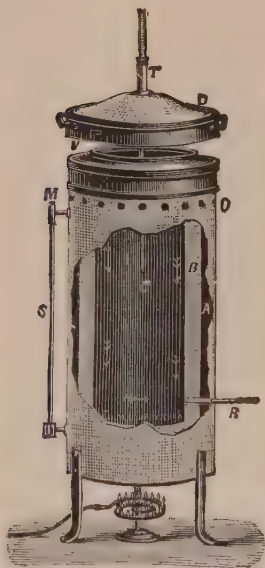


FIG. 27.

uses an apparatus by Lautenschläger, which acts in such a way that the dressings do not require drying after steam sterilisation (Fig. 27). When the operator uses silk and lint compresses, he can, by boiling, sterilise all the things necessary for the operation at the house of the patient

before the operation. By this plan the carriage of the armamentarium is simplified. Lint compresses are by no means so soft and elastic as sponges, and, consequently, they irritate the peritoneum much more.

Preparation of the Cervix, the Vagina, and the Perinæum, for Operation.

Whenever possible, the patient is purged two days before the operation.

On the eve of the operation the patient takes merely a cup of tea and a biscuit, and a simple enema is given. This is repeated three hours before the operation. After the bowels have acted the patient takes 15 drops of tincture of opium, has a warm bath, and puts clean linen on. She must take nothing beyond a cup of tea on the operation morning. In hospitals the patient is placed on a special operation table, but in private houses a strong narrow table, which need not be more than 40 inches long, will do. A mattress or several clean thick sheets (clean bed-sheets folded are the best) are laid on the table, and over these a waterproof sheet, which reaches to the pail under the table. This need only cover the lower half of the table. At the head of the table is a pillow. The patient, dressed in stockings, night-dress, and jacket, is laid, or places herself by means of a footstool, upon the table, so that the vulva lies in the vertical plane of the lower end of the table. The night-dress is tucked up as high as possible. The patient lies down, and a stool is placed to support her feet. She is anæsthetised in this position.

In very susceptible patients it is better for anæsthesia to be induced while they are in bed, and in another room, in order to spare them the sight of the instruments and preparations.

Anæsthesia¹ is usually induced in gynecological

¹ [On anæsthesia:—The best and simplest method of obtaining and keeping up anæsthesia is, in our opinion, as follows—

Take two parts of ether and one of chloroform and mix them. Of this

work by chloroform. It was the renowned English gynæcologist Simpson, who first used chloroform as an anæsthetic. In the *technique* we must at once draw attention to a great mistake which all beginners make in giving chloroform. This is that at the commencement they pour on the chloroform in quantity instead of in drops, and that they take away the mask as soon as touching the eyelid does not cause closure of the lids. Only a few drops at a time should be poured on, and then as soon as the inhaler loses the odour of chloroform a few more drops are used, and so on until the conjunctival reflex is lost. As precautionary measures before giving chloroform, any foreign bodies must be removed from the mouth (false teeth), the pulse and respiration must be watched unceasingly. If the breathing stops, the tongue must be pulled out at once with a pair of fine Muzeux forceps. If the breathing nevertheless continues superficial or ceases entirely, and the pupils (which in proper anæsthesia are small and do not react) are quite big and do not react, the face has a deathlike expression, the lips are cyanosed—artificial respiration, preferably by Silvester's method, must be performed at once.

For this purpose the head is depressed, the operator seizes both forearms near the elbow and extends both arms as widely as possible over the shoulders and head—inspiration; then by flexing the forearms rectangulary, the arms are pressed firmly against the sides of the thorax—expiration. These movements should not take place too rapidly, but about twenty times a minute. If, as is usually the condition in these cases, the heart's action is feeble, an injection of ether is given subcutaneously.

mixture place a sufficiency for the operation into a Clover's inhaler. Give the mixture by means of the inhaler, and use no air bag. The patient is allowed to draw a few breaths through the inhaler before the anæsthetic is turned on. This is then gradually turned to full. Once the patient is under, the indicator is kept at about 3, until the operation is over. Much air is thus always admitted, and no sudden variations and consequent dangers are possible.—F. E.]

Artificial respiration should be continued until regular spontaneous breathing sets in. The stopping of breathing, when it occurs in the stage of excitement, as "spastic asphyxia," is much less important. In this state the entrance to the larynx is blocked by the falling back of the tongue. This accident takes place even while the reflexes are still present. By drawing the tongue forward the breathing is at once re-established. If the jaws are tightly compressed the lower jaw should be pushed forward, in order to open the mouth. This is done by Esmarch-Heiberg's method. Both forefingers are placed behind the ascending rami of the jaw, and the jaw is pressed forward strongly. If this manipulation does not succeed, a gag must be pushed between the teeth, and the lower jaw prised open by separating the blades of the gag.

Most cases of "chloroform asphyxia" are primary disturbances of respiration. If the onset of the disturbance be recognised, death from chloroform does not take place. In rare cases heart paralysis is primary, and generally causes death. Together with the methods of assistance already given, Maass's direct heart massage should be done in these heart cases; this consists in quick compressions of the region of the heart about 120 times in a minute. If *vomiting* comes on during anæsthesia, the head should be turned to the side on the first movement of suffocation, so that the vomit may not get into the larynx. This same manœuvre should be done when anæsthesia is finished. In order to prevent vomiting during anæsthesia, chloroform should be poured freely upon the mask, and as soon as the head has been turned to one side the mask should be applied. Vomiting after anæsthesia stops most quickly when the patient takes absolutely nothing, not even fluids. For very great thirst simple washing out of the mouth, a sip of tea, or a piece of ice are useful. In acute anæmia anæsthetics may be given, but only in small doses. Of late many operators have returned to the old plan of inducing anæsthesia with ether. This has the undisputed advantage over chloroform that the deaths by paralysis

of the heart are entirely wanting. The pulse, even after long-lasting laparotomies, in ether anæsthesia is better than at the beginning, while in chloroform anæsthesia it may become very small. On the other hand, the after effects of ether are much more unpleasant than those of chloroform. In many cases bronchitis arises, and in one instance the author saw a case of creeping croupous pneumonia which endangered life. Ether also irritates the kidneys, and may exceptionally cause renal hæmorrhage. The author lost a case of total extirpation in which the autopsy showed granular kidney and acute nephritis. He has therefore, after using ether for half a year, gone back to chloroform.

For inducing ether anæsthesia the author uses Wanschsch's mask, which consists of a face piece and a rubber bag. 50-100 grammes (1·5 to 3 ounces) of ether are poured into the bag, and the face piece is slowly brought to the face and is fixed there firmly as soon as the ether vapour ceases to excite spasm of the glottis. By agitating the inhaler the patient breathes concentrated ether vapour. As soon as breathing stops, the agitation must be stopped, and the mask removed for a moment. Every other obstruction to breathing must be removed beforehand. The head must be kept turned to one side, and the lower jaw pulled forward. For this four fingers of the left hand are placed under the chin, while the thumb keeps the mask on the face (Grossmann). The other hand is thus free for shaking the bag and controlling the reflex and the pulse. The latter does not require continuous supervision. The cyanosis and the rattling breathing, which is due to copious secretion of mucus in the air passages, are annoying at the beginning. A flame should not be brought near the inhaler for fear of explosion. The usual fixed lights in an operation room are in this respect without danger, because the heavy vapour of ether sinks to the floor.

Chloroform gives off chlorine and hydrochloric acid in petroleum or gaslight (Stobwasser, Kyll), and this may cause inflammation of the lung (Zweifel). In small rooms,

therefore, thorough ventilation should be obtained after an operation.

As soon as the patient begins to go under, the crutch is applied; in the absence of assistants this is invaluable. The most convenient crutch is that of Schauta, and I am very pleased with it [called Clover's in England]. It consists of two padded half rings, which are united by a cross-bar. These half rings are applied below the bend

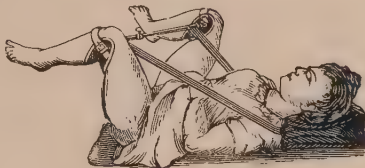


FIG. 28.

of the knee, and fastened to the leg by straps which buckle on the outer side. A strap is fixed to the cross-bar, which is carried over one shoulder and under the other arm, and pulled so tightly that the lithotomy position follows, or if the thighs be still more flexed, a dorso-coccygeal position ensues.

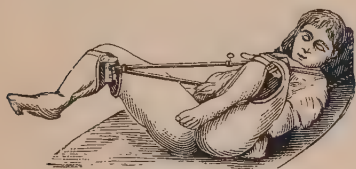


FIG. 29.

This crutch has the further advantage that it can be easily taken to pieces and carried in a small bag.

In the meantime the operator and his assistants have got themselves

ready for the operation by putting on linen operation smocks (the operator wears a waterproof apron underneath this), by taking off rings, by cleaning the nails from visible dirt, and by disinfecting themselves.

Then the nails, the hands (each finger separately) are brushed vigorously for five minutes with soap and warm water. The soap lather is washed off from the hands and brushes with fresh water (soap and corrosive sublimate combine, and the antiseptic power of the sublimate is injured), and then the nails, hands, and arms are brushed for two minutes in a warm 0.1 per cent solution of cor-

rosive sublimate, or a 3 per cent solution of carbolic acid. Instead of this by Fürbringer's method the hands are brushed for a few minutes first with soap and warm water, secondly in spirit, and lastly, in warm 0·2 per cent solution of corrosive sublimate, or 3 per cent solution of carbolic acid.

When a 1 per cent solution of lysol is used the foregoing washing is not necessary. The hands are brushed simply for three minutes in a soapy lysol solution.

Now as to the disinfection of the patient.

The vulva is well soaped, shaved, and, with the neighbouring parts (the inner surfaces of the thighs and the anal region), is disinfected most conveniently by Fürbringer's method, or with a 1 per cent solution of lysol. Then the vagina and uterus are washed out with a 3 per cent solution of carbolic acid, or a 1 per cent solution of lysol, and at the same time, when the parts are sufficiently dilated, the solution is rubbed into the vaginal and cervical walls with the fore and middle fingers. The catheter is now passed and the douche allowed to play. The catheter is left in the bladder, and for this purpose an india-rubber tube is fixed upon it and clamped.

The use of the irrigator during the operation has the advantage that the field of work is fully exposed to view by the continuous removal of blood. Larger spurting vessels are naturally seized and immediately ligatured. A 0·6 per cent solution of purified common salt is the best for irrigation, as pure water causes the tissues to swell.

If no sterilised water (either by boiling or filtering) is to be had, then an antiseptic must be used, as, for instance, 1 in 10,000 corrosive sublimate solution, or $\frac{1}{4}$ per cent solution of lysol. When operating in a private house the solution is made in a clean can, and a siphon tube is placed in the can, which is set upon a cupboard or suitable rest. The flow is regulated by a clamp or by simple nipping or squeezing the tube. In perineum operations the author usually places a small double-channelled catheter in the vagina; this is connected with the irrigation tube, and is easily managed by an assistant.

Preparation of the Instruments for Abdominal Section.

As a surgeon cannot always operate at the hospital, where the necessary preparations can be quickly seen to by the resident staff, it is recommended that the armamentarium for a laparotomy should be kept ready for immediate transport and use. For instance, in a ruptured tubal gestation every instant saved cannot be prized too highly. For this purpose the author has had a bag made of strong sailcloth by Messrs. Schmidt, which contains

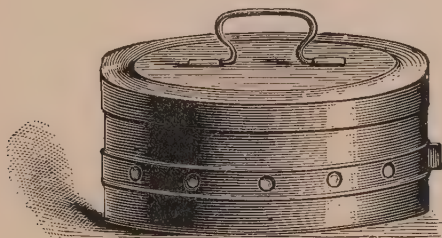


FIG. 30.—Large box for the sterilisation of sponges.

The box is opened for permeation with steam or hot air by slipping off the central band; on pushing it back, after the sterilisation is over, the box becomes air-tight again.

four compartments. One compartment receives the previously sterilised nickel cases with instruments. The second contains a case holding the sponges (Fig. 30), which have been dry sterilised. The third compartment contains the box No. 2 mentioned on page 23, which is equally available for drainage of the peritoneal cavity or tamponade of the vagina, as well as the case 40 (Fig. 31). The latter, while only standing 10 cm. (4 inches) high, yet holds quite sufficient sterile and antiseptic dressing for an abdominal section. The fourth compartment is reserved for the following articles:—A drainage tube, a piece of rubber tubing used as an elastic clamp, a measuring

tape, two hand-brushes, a siphon, a holder with silk and

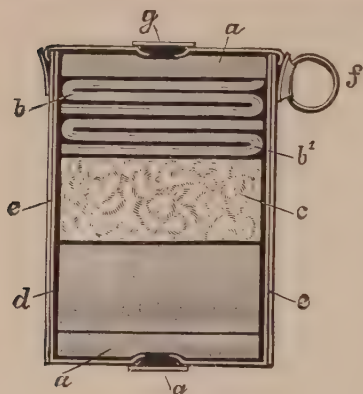


FIG. 81.

one with catgut, a chloroform inhaler with drop-bottle, the operating coat and rubber apron, 20 corrosive sublimate tablets, a list of the two instrument trays with all the instruments. Under this heading come the already mentioned accessories, and the following medicines and drugs which are used before, during, and after the operation:—Chloroform, 200 grammes; car-

bolic acid, 500 grammes; 20 corrosive sublimate tablets; alcohol, 500 grammes; 10 per cent alcoholic solution of salicylic acid, 100 grammes—these various antiseptics may be replaced by 300 grammes of lysol—ether, 20 grammes; chloride of sodium, 6 grammes.¹

R Bismuthi subnitratis, gramme 0·5

Extract. opii, gramme 0·05

Misce fiat pulvis. Divide in doses tres.

If great expedition is required these medicinal articles, or at least chloroform and lysol, should be taken with one as a precaution. In the instrument case are the following

¹ Chloroform	200 grammes=about	6 ounces
Carbolic acid	500 " = "	15 "
Spirit	500 " = "	15 "
Salicylic acid in alcoholic solution	100 " = "	3 "
Lysol	300 " = "	9 "
Ether	20 " = "	5 drams
Castor oil	30 " = "	1 ounce
Common salt	6 " = "	1½ drams
Bism. subnit.	·5 " = "	7·5 grs.
Ext. opii	·05 " = "	·75 "

instruments held in two compartments:—In the upper compartment—2 scalpels, 1 probe-pointed and 1 lance-shaped bistoury, 3 Koeberle's forceps, 4 pressure forceps, 2 curettes, 2 needleholders (Hegar's), 1 director, 1 razor, 1 exploring syringe (Overlach), 1 pair of Vowinkel's self-acting retractors of the edges of the wound, 1 ovariectomy trocar (Hegar). In the lower compartment—2 retraction hooks (Billroth), 2 Nelaton's cyst forceps, 4 volsella, 2 Museux forceps, 1 four-toothed forceps, 2 Fritsch's dressing forceps, 1 ovarian forceps (Hegar), 1 Spencer Wells' clamp, 2 Deschamp's needles, 2 hook forceps, 2 pairs Cowper's scissors, 2 catch forceps (Schröder), 6 Koeberle's forceps, 1 long dissecting forceps, 1 uterine sound, 1 male catheter, 1 double-channelled catheter, 1 Peaslee's needle, 1 packet of needles, 1 needle for infusion, 1 glass tube.

This list of instruments is copious.¹ With the certainty of asepsis the precept of Schröder that the armamentarium

¹ [On the instruments for laparotomy:—The following instruments are placed in readiness for the translators at each abdominal section, the instruments enumerated in the first section being placed in trays, and covered with boiling water when the patient is anæsthetised:—

12 small catch-forceps.

2 large " "

2 handled needles, threaded with thick silk

2 " " finer "

1 scalpel (sharp).

1 needle for suture of incision (silkworm gut).

1 scissors.

1 metal canula with tube (for washing out of the abdomen).

4 glass drainage-tubes of different sizes and lengths.

The following, after thorough cleaning and sterilisation, are kept in air-tight cases ready for immediate use if necessary:—

1 large ovariectomy trocar-canula.

1 small straight trocar and canula.

1 " curved " "

1 lithotomy scoop for gall-stones.

1 volsella (for seizing uterus from above).

2 wire clamps (with wire in position).

4 transfixion pins.

1 needle holder (with needles of various sizes and shapes).

It is only very rarely that any other instruments are required. When they are, these are brought by the operator himself. Sterilised rubber (for temporary clamp), sterilised silk (for ligature and suture), and silkworm gut are always in readiness.—Tr.]

should be the simplest possible has nowadays no practical value. With the instruments named any gynæcological operation may be carried out, although they are specially given for abdominal section. There is no mirror in the list. For a case of Freund's operation a mirror is required, and even the crutch must be taken, which has been already shown in Fig. 28.¹

Preparation of the Patient and the Operation Room for Abdominal Section.

The patient must take 30 grammes of castor oil two days before the operation, and three bismuth and opium

¹ [On the preparation of sponges:—After each operation the sponges are carefully washed in warm water until free from all traces of blood. They are then placed in a clean glass jar, and covered with a hot solution of soda, half a pound of soda being used for six sponges. The jar is closed, and placed on one side for twenty-four hours. The next day, after thorough washing and disinfection of the hands and arms (with hot water, antiseptic soap, and the use of the handbrush as before operation), the sponges are removed from the soda solution and repeatedly washed in hot water, until the water in which the sponges have been washed remains perfectly clear and tasteless. This is a tedious process, and needs one or two hours' hard work, with a copious supply of boiling water. A little lysol added from time to time materially assists the work of soda-cleaning and lessens the duration of the process. It is best to pour boiling water over the sponges until these are well covered, and to let them soak for five minutes in this before squeezing them in and out of the water. The water is constantly changed until the sponges are clean. The sponges are then placed in a second clean glass jar, and covered with a solution of carbolic acid (1 per cent). The jar is closed and placed on one side for twenty-four hours. The next day, after fresh washing and disinfection of the hands, the sponges are taken out of the solution, squeezed nearly dry, and arranged in a single layer on one half of a large clean handkerchief or small towel, which is spread out fully open on a double fold of newspaper. The free half is folded over the sponges, and the sides and end of the paper and towel are closed by double folds, which are fastened with pins. This paper bag, with its enclosed sponges, is then placed on part of the kitchen range or before a slow fire until the sponges are absolutely dry (one or two days). Again, with hands absolutely clean and disinfected, the dry sponges are removed from their temporary bag and placed in a clean white cotton bag, the mouth of which is tied tightly, and the bag is hung from the kitchen ceiling (being the driest place in the house) until the sponges are needed for use.—J. W. T. (Enlarged and modified from directions of Lawson Tait).]

powders during the night before the operation. During the night she has a pad soaked in a 1 per cent lysol solution applied to the abdomen. On the eve of the operation she has a large simple enema, and this is repeated in the morning one hour before the operation. After the last enema has acted, the patient must take a warm bath, soaping herself well, and then put on clean linen. The bed-clothes are also changed during the bath. On the operation morning the patient must take nothing beyond a cup of weak tea. In the two days before the operation she must have at least two complete baths, the vagina must be douched three times a day by Fritsch's method with a solution of 0·3 per cent salicylic acid or 0·02 per cent corrosive sublimate, or 1 per cent of lysol. The patient must accustom herself to pass her water while lying, so that the catheter may not require to be used after operation.

In hurried cases one necessarily operates without these preparations. The operation room must be freed of all superfluous things. The operation table with one or two other tables or benches for six basins and the soap dish are all that are necessary. If irrigation is necessary, and there is no new irrigator at hand, a board is fixed 1 metre (40 inches) above the level of the operating table, and the vessel containing the irrigating fluid with siphon is placed upon it. The room must be cleaned out from floor to ceiling the day before; all dusty articles, such as curtains, must be removed. The windows are left open all night. On the morning the room is heated to 20° C. (68° F.). At least 20-30 ¹ litres of boiling water must be ready. When there is not time enough for this to cool down to the body heat, 10-20 litres of distilled water must be added to it. A pail with boiled water, and an empty pail to receive used water, must stand ready in the operation room. The basins, the pail, and the vessel must all be washed most carefully with lint dipped in 1 in 500 corrosive sublimate

¹ 30 litres = 54 pints

20 „ = 36 „

10 „ = 18 „

lotion, inside and outside, and especially on the edges and handles.

The operation table must be about $1\frac{1}{2}$ -2 metres long (60 to 80 inches), and may be formed of two tables placed together. When there is no waterproof sheet, more clean bed-sheets are used instead, beneath which, at the head of the table, a pillow is placed; if necessary a mattress can be laid underneath, and by means of cushions a Trendelenburg position improvised. In the latter position the head of the patient lies facing the window. The patient is anæsthetised in a neighbouring room and placed entirely unclothed upon the operation table. A dry blanket is wrapped round the lower extremities, and the field of operation is entirely surrounded by towels squeezed out of a sublimate solution (1 in 500).

The instruments which are required are taken out of their cases and placed in metal trays, the covers of which are used to hold the needles and sutures. The instrument cases are placed upon a hand towel wrung out in 5 per cent solution of carbolic acid. The sponges are put in a warm 3 per cent solution of carbolic or in plain boiled water. Three or, when possible, more basins are used for holding and cleaning the sponges, three others are used for disinfection of the hands in water, spirit, and 1 in 1000 sublimate lotion.

The abdomen of the patient is disinfected after the already described method of Fürbringer, the pubes is shaved and a catheter is passed into the bladder. When a 1 per cent solution of lysol is used the other antiseptics are not required.

The operator must have at least two assistants, one to give the anæsthetic and the other to assist in the operation. In this case the operator must see to his instruments and sponges himself, and take care to have a sufficient number of needles threaded. A third assistant or a trained nurse who can hand the instruments and thread the needles, and a fourth assistant who can change the solutions for the sponges, are very useful. A fifth assistant takes charge

of the catheter in the bladder and presses small tumours upwards from the vagina. The anæsthetist, failing other assistance, can pass the catheter, and with the position of elevated pelvis (Trendelenburg) no vaginal pressure is needed.

Remarks on the Technique of Laparotomy.

Laparotomy means section of the flank, and therefore the term "Cœliotomy" (section of the belly) proposed by Harris and Sänger is more correct.

Position of the Patient.—The best position is that of Trendelenburg, with the pelvis elevated. In this position the bowels fall down to the diaphragm, and the pelvic organs are at once visible and can be got at, so that one can pass sutures under the guidance of the eye even at the bottom of Douglas's pouch. Exenteration, the bringing of the bowels out of the abdominal cavity, which may cause fatal paralysis of the bowels (Olshausen), is not necessary in this position, and moreover the bowels are easily pressed completely out of the field of operation by sponges. If the bowels are adherent to the pelvic organs they obstruct the operation field, in spite of the pelvic elevation. It may be advantageous in this case, before separating the adhesions, to seize the upper part of a broad ligament with the fore and middle fingers of the left hand close to the uterus, and to pass a Deschamp's needle through it under the guidance of the fingers. The uterus and ligament may be then drawn upwards and become visible between the bowels by pulling on the suture passed.

The author uses Leopold's wooden stand for elevating the pelvis; this can be screwed to any table. According to Schauta the position must be changed back to the horizontal before closure of the abdominal incision, so as to avoid ileus.

The Incision.—The operator, standing on the right hand side of the patient, draws the abdominal walls up-

wards with his left hand, and cuts in the middle line beginning at the navel. The incision ends 4 cm. (1·6 inches) above the symphysis pubis, so as to avoid future hernia. The incision goes through skin and cellular tissue to the linea alba at once. The assistant sponges carefully, and all spouting vessels are seized with forceps. The linea alba is grasped by two catch forceps held by the operator and his assistant, and the small fold thus formed is divided by the operator. The whole aponeurosis is thus divided, and when the subperitoneal fat presents itself it is treated in the same way. The peritoneum, which protrudes like a bladder, is now laid bare. As intestine is often lying close under the peritoneum, the latter must be taken up with the forceps very carefully and then divided.

The operator introduces his right forefinger into the opening so made, and feels whether there are any parietal adhesions of the bowels or tumour. If none are found, then the peritoneum is incised upwards and downwards with a probe-pointed knife. The pressure forceps which were previously applied can now, as a rule, be removed. If the tumour does not come forward the assistant pushes the bowels to one side with sponges, and the operator finally forces his whole hand inside the abdomen to estimate the position of the tumour, the condition of the pedicle, and the adhesions. The assistant must now aid the operator by retracting the edges of the wound.

Omental adhesions are met with most commonly; the omentum adheres to the bowels under it, the bladder, and the anterior belly wall, and may shut off entirely the entrance into the pelvis. In these difficult cases an almost complete resection of the omentum may be required. Adhesions of the bowels to the tumour are separated bluntly with the finger, or, when in bands, are tied in two places and divided between, or simply divided with Paquelin's cautery on a director.

If the adhesions are too firm for removal, it is better to leave a piece of the cyst wall upon the bowel, and to cauterise the internal surface of this.

If, in separating adhesions, losses of peritoneal or muscular coats of bowel arise, the spaces must be covered with peritoneum drawn over by means of fine catgut sutures. Penetrating wounds of the bowel should be closed by Czerny's double suture.

Adhesions of the tumour with the anterior abdominal wall, the rectum, the bladder, the uterus, and the posterior surface of the broad ligament, when superficial, are separated bluntly, and when in bands are double ligatured and divided. Small tumours of the adnexa (pyosalpinx) almost always form adhesions with the posterior surface of the broad ligament, and thus simulate an intra-ligamentary origin (*pseudo-ligamentary tumours*). In this case, after passing the ligature at the angle of the uterus, the tumour should be separated bluntly from the broad ligament from below and behind. The infundibulo-pelvic ligament, which before was rolled into the pelvis, becomes visible, and can be ligatured, whereupon the rest of the ligament between these two leading sutures can be easily ligatured off beneath the adnexa to be extirpated.

Intra-ligamentary tumours are those which, instead of growing in the free abdominal cavity, grow between and adhere to the layers of the broad ligament. These tumours should be bluntly enucleated from their bed in the broad ligament whenever possible, after passing the two leading sutures and splitting the peritoneum covering them. The incision in the broad ligament is then stitched up at once. Larger adnexal tumours, which have not developed intra-ligamentarily nor become adherent in the pelvis, elongate the upper part of the broad ligament. This part, in which the ovarian ligament and the tube lie in ovarian cysts, is called the pedicle.

When a large cystic tumour without adhesions presents itself it will usually be found that this is an ovarian cyst, having a bluish-white appearance as opposed to the vivid brick-red tint of fibroids. If there is a suspicion of purulent or decomposing contents in the presenting tumour, it

is punctured with the needle of an aspirator, and the operator endeavours, by enlarging the incision, to extract the tumour whole. Sometimes the operator cuts into the tumour with his knife, the assistant catches the sides of the incision thus made with hook forceps, the operator then seizes them with Nelaton's forceps and draws the opening well forwards. Meanwhile the assistant, by pressing the edges of the wound together, prevents any cyst contents entering the peritoneal cavity. By opening up other cavities the cyst becomes so diminished that it can be extracted through a very small incision. When the pedicle is long it can be ligatured outside the abdomen. The abdominal cavity is then shut off by means of a sponge, or by drawing the margins of the wound together. With a broad pedicle which requires numerous ligatures, it is convenient to seize the pedicle with Spencer Wells' clamp, then to cut off the tumour and to ligature beneath the clamp.

Solid tumours can be got out through relatively small incisions by engaging them in their smallest circumference and working the wound edges backwards over them. After ligature the pedicle is cut through and sponged clean, the parts are cleaned from escaped blood or cyst contents (peritoneal toilet) and after the operator has satisfied himself, by ceasing to pull on the ligatures, that there is no bleeding from the pedicle, the ligatures are cut short. All sponges are removed and counted and a flat sponge is placed over the bowels, next the incision, to protect them during suture of the wound.

Grave Complications.

1. Bleeding from adhesions torn through, or from stripped peritoneal surfaces, or from the pedicle, or as a result of the ligature slipping off or becoming loose.—Bleeding points are stopped by compression with hot sponges or by the thermo-cautery, more severe bleeding by ligature or suture, or by shutting off the bleeding surface

from the peritoneal cavity. For this purpose, after removal of colossal tumours, large sections of the abdominal wall may be brought together in a fold, by sutures passed outwards through the bleeding parietal peritoneum. When the bleeding is deep in the pelvis, a pair of dressing forceps are pushed through the floor of Douglas's pouch into the vagina, the part is tamponaded, and the uterus is sutured to the rectum above the tampon, or the infundibulo-pelvic ligaments are sutured together. The author was able in this way to stop the bleeding from the left uterine artery after an abdominal total extirpation.

2. **Escape of infectious contents** of a tumour into the abdominal cavity. This accident is often unavoidable with pyosalpinx unless the pus-distended tube is first tapped and washed out with lysol. The pus should be kept from the bowels by sponges placed beforehand, and should be quickly removed. If the pelvic peritoneum is much stripped off after removal of a tumour of this kind, the drainage should be carried out by the vagina as described for hæmorrhage. The author no longer drains from the abdominal incision, since in this way very obstinate fistulæ may be left.

3. **Injuries of the bladder, the bowel, and the ureters—ligation of the ureters.**

Lesions of the bladder are closed by Czerny's suture,—a divided ureter is sutured together on an elastic catheter, which is introduced and left in several days, or its renal end is implanted in the bladder (uretero-cystotomy).

If the operation must be finished off quickly, the ureter may be stitched into the lower angle of the wound.

4. **Death from anæmia of the brain** from sudden emptying of the abdominal cavity by tapping a colossal tumour. This is guarded against by emptying a cystic tumour slowly with the pelvis elevated.

Closure of the Incision.¹—This is produced by deep

¹ [On technique :—*Incision.* English teaching, and especially that of the Birmingham school, tends to restrict the size of the incision in all

sutures which lie $1-1\frac{1}{2}$ cm. (0·4-0·6 inches) apart, and are passed through the whole thickness of the wound and come out about 1 cm. from its margin. The assistant collects the sutures with his left hand as they are passed from below upwards. When all the deep sutures are inserted the operator and assistant each gathers with his left hand all the ends on his own side, the assistant draws upwards the middle suture with his right hand, while the operator holds the next lower suture with his right middle finger and draws out the sponge with the right forefinger and thumb. He now hands over to the assistant the suture ends of his own side. The assistant, with his right hand on the upper part of the abdomen, gradually presses out any retained air from above downwards, pushing together the wound edges as he does so, to prevent fresh entrance of air or the inclusion of omentum or bowel.

The operator ties each deep suture from below upwards with a triple knot, and supplements these with superficial stitches which ensure exact closure of the wound. After cleaning up the patient from blood, etc., the wound is dusted with iodoform and a dressing of iodoform gauze, over which a wound pad is applied, and secured with a binder.

The after-treatment is very simple. For vomiting and thirst bits of ice are given. Morphia hypodermically and by suppositories is administered only for severe pain, and if no cardiac weakness is present. For syncope the best remedies are injection of ether, warmth, and, after great loss of blood, the infusion of a 0·6 per cent solution of common salt. As soon as the tendency to sickness has

uncomplicated cases. The incision is usually begun not higher than a point midway between the umbilicus and pubes, and extended only when adhesions or the presence of a solid tumour may demand it. An abdominal incision of two inches is usually sufficient for an uncomplicated operation.

After-treatment (Birmingham). No ice is given. Both food and drink are entirely withheld until the bowels have been opened or flatus has been passed. The latter is encouraged after twenty hours (or earlier if there be distension) by frequent enemata of warm soap and water, containing spirit of turpentine ℥ss. and ol. ricini ℥i. for each enema. Water gruel may often be allowed on the evening of the second day.—J. W. T.]

passed off fluid nourishment is given, such as tea, coffee, a spoonful of a strong wine, beef-tea, and milk. When bowel distension has ceased, which usually takes place on the third day, beef-tea with egg, rice, or milk soups can be ordered, and gradually following the appetite, meat diet is reached. The Americans give tea for thirst without fear, and aim at movement of the bowels by saline laxatives on the second day.

The temperature must be taken twice daily. The stitches are removed on the tenth day, and on the fifteenth day the patient may get up when the operation has been a simple one. She must, however, wear a well-fitting belt for a year. It is very important to recognise secondary hæmorrhage after an operation, so that the abdomen may be reopened and the hæmorrhage be controlled. Secondary hæmorrhage may be presumed when a strong patient gradually sinks after a small operation, and the pulse grows worse all the time. In order to diminish shock a subcutaneous infusion of common salt solution is given immediately before the second operation (Wyder), and anæsthesia is induced with ether (Author). Symptoms of ileus arise from true intestinal obstruction less frequently than from sepsis (pseudo-ileus of the English). When the first is suspected the abdominal cavity must be reopened. In the only case of ileus met with by the author he was able in this way to save the patient. Apart from the already mentioned causes of death a patient with lung, heart, or kidney disease may die of these after the operation. Antiseptics introduced into the peritoneal cavity and anæsthetics are especially deleterious under these circumstances. In heart diseases ether should be chosen, in lung diseases ether is more dangerous than chloroform, and in kidney diseases it is equally dangerous with chloroform.

Death after abdominal section is usually the result of sepsis.—This may be caused by external or by self-infection. The former is becoming rarer and rarer.

The author in 150 laparotomies did not lose one from external infection. Self-infection arises from the escape of infectious cyst contents, of bowel contents, or of urine into the peritoneal cavity. Sepsis comes on in the form of septic peritonitis. Vomiting sets in after the operation, the belly is tender and distended, the pulse is very small and frequent, the general condition is serious, and the expression of the face is anxious. The temperature rises from the first day onwards, but may be or may become subnormal. The facies hippocratica develops, and the sensorium is dulled, and death occurs within the first three days. According to Runge the treatment is the free administration of alcohol. Only small doses are given during vomiting. When the vomiting is more severe feeding per rectum comes into consideration.

Fever may come on in the later periods as a result of septic inflammation. This leads mostly to circumscribed suppurations of the pelvic walls or the ligatured parts, or to abscesses encapsuled between the bowels. Commonly the pus comes through at the abdominal incision. If not, an opening must be formed upward or into the vagina. The temperature then usually sinks quickly to normal. Hernias of the wound or obstinate abdominal fistulæ are, however, often left behind.

These circumscribed suppurations owe their origin to insufficiently sterilised ligatures, the sowing of not fully virulent bacteria upon the peritoneum during the operation, new infection of the stump from the uterus, blood effusions, and foreign bodies (sponges) left behind in the abdominal cavity.

After a perfectly reactionless course a case of abdominal section may die of embolism of the pulmonary arteries on getting up, or ileus may come on after months. Omental adhesions with the wound scar or the pelvic organs may give rise to very severe discomfort. If the ovaries have been extirpated the troubles of anticipated climacteric arise, such as flushing in the head, nervous excitement, etc. The author has seen excitable conditions,

hallucinations, or blunting of the sensorium just after laparotomy from iodoform intoxication.

The cases of death from the injurious action of antiseptics may be avoided by operating aseptically. For this gauze compresses sterilised in a current of steam, or sponges dry sterilised, are used within the abdominal cavity. Walthard and Sanger say that dry asepsis leads to stripping of the peritoneal epithelium and to adhesions, and they therefore recommend the damping of the compresses or sponges beforehand with Tavel's solution (2.5 sodii carbonati calcinati, 7.5 sodii chloridi, aquæ distillatæ 1000). The author, however, has found no evil results from using a half per cent solution of lysol for this purpose.

VAGINAL LAPAROTOMY, OR CÆLIOTOMY.

VAGINAL cœliotomy, an operation described by the author, avoids the disadvantages of ventral laparotomy which have been mentioned, and the author feels compelled to describe it more minutely, because there is nothing about it in the gynæcological text-books.

This procedure consists in opening the abdominal cavity from the anterior vaginal fornix.—For this purpose the posterior blade of Simon's speculum is passed, the anterior cervical lip is seized with two pairs of volsella and drawn down to the vulva, and the bladder is pushed forwards and upwards with a small catheter.

The operator now makes an incision 1 cm. long at the insertion of the anterior vaginal fornix into the cervix, he seizes the upper margin of the wound with a volsellum and draws it strongly upwards, he deepens the incision with scissors and lengthens it on both sides by 1-2 cm., in doing which the incision must be made quite close to the uterus on account of the ureters. If the vagina is separated from the anterior wall of the cervix by this incision, and the assistant draws the vaginal wound margin strongly upwards, the bladder is pulled away from the cervix (or with slight assistance from the operator's finger) as high as the internal os. It is a mistake to press now with the finger bluntly upwards between the visible bladder and the anterior cervical wall—the plica vesico-uterina is only unnecessarily pushed out of the way, and its opening rendered more difficult. It is much better to place the left forefinger right over the internal os on the anterior

wall of the uterus. One feels the plica then as a thin displaceable membrane lying on the uterus, and can push it down so far with this finger, while keeping the latter constantly pressed against the uterus, that it becomes

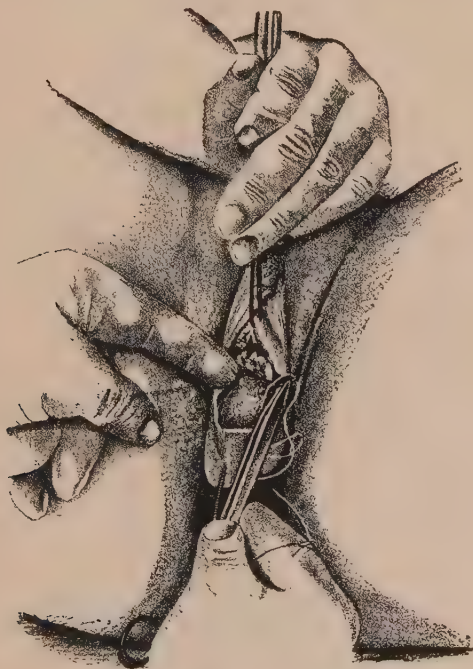


Fig. 32.

visible beneath the transverse mass of the bladder and can be opened with scissors.

If the plica cannot be drawn down in this way, owing to its defective separation from the bladder and uterine body, the first provisional suture is passed at the highest visible part of the anterior surface of the uterus, which

projects clear of the bladder prominence. The bladder may be slightly pushed upward with the dorsal surface of the forefinger, so that the point of the needle when passed appears on the volar side of the finger (Fig. 32). If the assistants pull carefully down on the silk tractor threads

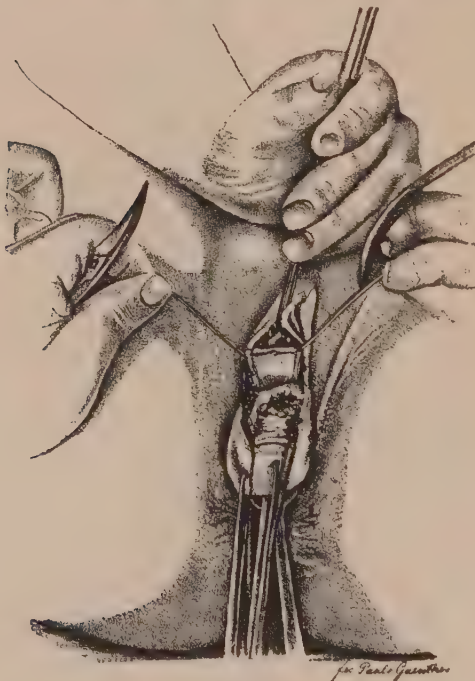


Fig. 33.

one can open the peritoneum *in situ* at this time (Fig. 33), unless the plica has been unnecessarily pushed up beforehand—or the opening takes place after passing a second higher provisional suture. The opening of the peritoneal cavity may be safely postponed until the uterus has been anteflexed.

be drawn forward to the vulva (Fig. 34). This is done by pressing back the cervix and by pulling down the fundus with one or two pairs of volsella or further provisional sutures if the volsella tear out. Many operations can now be carried out upon the pelvic organs, which are as visible as in ventral laparotomy, and for which formerly the latter was required, as enucleation of myomata, many operations on the adnexa, extirpation of cystic pediculated ovarian cysts, cure of retroflexion by stitching the fundus to the anterior vaginal wall, intra-peritoneal vaginal fixation.¹ In order to give more space for extracting a greatly enlarged uterus a longitudinal incision may be made into the transverse one, thus forming two vaginal flaps 1-2 cm. away from the bladder (Mackenrodt). After the operation has been performed, the adnexa and the uterus are returned, and the peritoneal and vaginal wounds are closed with continuous catgut sutures.

Special advantages of the operation over ventral laparotomy.—I advance first the short time of healing. The patients were able to get up after eight days (while the immediate troubles after operation were no more than after a curetting), and could leave the clinic on the ninth or tenth day (with the exception of those cases where there was also a perineoplastic operation required). They required no bandage of any sort, and owing to the position of the operation scar in the anterior vaginal fornix, were completely guarded against omental or bowel adhesions or the possibility of hernia through the scar.

I might also advance the smaller danger of this operation in comparison with ventral laparotomy as a special advantage. Although the peritoneum is opened the whole operation practically takes place outside the peritoneal cavity. This is due to the fact that the wound margin of the anterior vaginal wall is quite firmly applied to the posterior uterine wall, while the latter is pressed firmly against the symphysis. As a result the bowels certainly never come into sight during the operation. No fatal

¹ See also the chapters on retroflexion, myoma, and ovarian tumours.

case, nor any disturbance from sepsis, has been observed by me in my fifty cases. These manifold advantages make us regret that the operation is, owing to anatomical relations, naturally limited to a smaller sphere than ventral laparotomy.

It is only applicable in those cases where the cervix can be drawn down to the vaginal entrance. Myomata should not be larger than the fist. Ovarian tumours may be larger, but should not be strongly adherent. Diseased appendages can only be removed by this operation when they can be drawn out into the vagina.

In isolated cases the ovaries have been previously removed *per vaginam* (Battey). But the results were less favourable because the ovaries were brought down into the vagina by traction applied directly to themselves, and not by indirect traction on the uterus as by my method. If the ovaries are fixed, they get torn by direct traction, and bleeding very difficult to stop, or perimetritic inflammation in the pouch of Douglas, may arise. For perimetritic adhesions and their evils opening of the pouch of Douglas may be alone to blame. Operations on the uterus cannot be made at all from the pouch of Douglas, because the forcible retroflexion necessary for this may lacerate the bladder.

DISEASES OF THE VULVA.

Inflammatory Diseases of the Vulva.

VULVITIS arises from uncleanness, especially in stout women, from various discharges (cancerous discharges, decomposing urine in vesico-vaginal fistulæ), in connection with broad moist condylomata, from masturbation, and from wandering thread worms, as a result of pruritus vulvæ, but most frequently from gonorrhœal infection.

The **symptoms** are those of inflammation generally—swelling, redness, pain, and purulent discharge. If the inflammation reaches the sebaceous glands round the vulva, acne points and boils result. When the inflammation is gonorrhœal, pus can be expressed from the urethra. With this, pointed condylomata and very painful inflammatory swelling of the lower third of the labia majora are often found. The latter is caused by acute inflammation of the glands of Bartholini. This generally goes on to suppuration. At the beginning pus may often be expressed from the mouths of the gland ducts. If one does not incise at the right time, cellulitis of the parts round the glands may ensue, with finally escape of the pus externally, into the vagina, or the rectum. In this way a recto-vaginal fistula may arise.

If the inflammation is limited to the gland duct, it may become cystic. The inflammation of the duct shows itself by reddening of its orifice like a flea-bite (macula gonorrhœica), and this is one of the most persistent signs of chronic gonorrhœa.

The **diagnosis** of vulvitis is easy, but the fundamental points of the disease, and especially inflammatory diseases of the internal genitals, must not be lost sight of. The **treatment** is directed against the cause of the disease. Thus the cure of vulvitis is aided by cleanliness (as hip-baths, douching with 1 in 1000 solution of corrosive sublimate, applications of lead lotion) by rest and removal of all irritation, and by wearing absorbing diapers as of moss.

In acute inflammation of Bartholini's glands and furunculosis vulvæ, early incisions should be practised. When the acute stage has passed into the chronic one, astringent syringings, as 1 per cent chloride of zinc, or painting the vulva with 10 per cent nitrate of silver solution, are prescribed. With more chronic onset, as when a dermatitis is the primary lesion, salves, such as Lassar's (Acid. Salicyl. 2, Vaseline 50, Zinc oxid. et Amyli ana 25), are applied. The salve should be washed off with soap and water.

In gonorrhœal urethritis I use the canula recommended by Fritsch (Fig. 35), to which is attached a syringe filled with a 5 per cent solution of silver nitrate. The canula is passed until by the cessation of resistance it is felt that the tip is in the bladder. Then it is drawn back very slightly, and the solution is ejected. If vesical catarrh also is present, it is best treated by washing out the bladder daily. In milder cases a 1 per cent solution of boro-salicylic acid does very well. In more severe cases washing out with 0.1-0.2 per cent solution of silver nitrate brings about a more speedy cure. By injecting previously a few grammes of a 5-10 per cent solution of cocaine (Braun's syringe), the severe pain of this treatment is lessened, 2-3 similar injections of cocaine cure hyperæsthesia of the bladder (irritable bladder), a neurosis which Olshausen, in the absence of definite disease of the genitals, regards as a relic of vesical catarrh.



FIG. 35.

Pruritus Vulvæ.

Unbearable itching of the vulva arises from vulvitis, from various skin diseases in the neighbourhood of the vulva—as prurigo, varicose veins, isolated hypertrophies and atrophies of the skin (Kraurosis vulvæ, Breisky) from diabetes (through bacterial growth), in diseases of the genitals and urinary organs, and as a pure neurosis in old women.

Since, from scratching, all sorts of secondary skin changes arise, the features of the disorder are by no means simple. It often leads to masturbation, and reciprocally it can also follow masturbation. The treatment consists in curing the vulvitis (see above), the relief of prurigo by inunction of tar (7 per cent alcoholic solution), or Wilkinson's ointment and a subsequent protracted course of baths. In localised changes of the skin Schröder and Küstner excise the diseased part and close the gap by sutures. When no local changes are found, search must be made for diseases of the genital or urinary organs, and the condition must only be called a pure neurosis when none of these are present. For this condition a 3-10 per cent solution of carbolic acid, as recommended by Schröder, has been found most useful. Gusserow got good results by applying strong solutions of alum and chloroform. Van Campé used a weak constant current with success. Ols-hausen of late recommends a 10-20 percent solution of silver nitrate, or the lapis mitigatus (1 in 2). These cauterisations must be made six or more times, and perhaps anaesthesia may be necessary. If not, a 10 per cent solution of cocaine must be used.

Tumours of the Vulva.

1. **Herniæ.**—If these pass into the labia majora from the inguinal canal, they are called herniæ inguinales

labiales seu herniæ labii majoris anteriores, if they come down between the bladder and the vagina, or between vagina and rectum, they are called herniæ labioaginales seu herniæ labii majoris posteriores, or pudendal and perinæal herniæ.

Diagnosis.—These are swellings which give a tympanitic note on percussion, are not tender, and can be reduced, whereupon the place of the rupture can be felt.

In any enlargement of the labia majora, they must be borne in mind, although they are so rare.

The treatment in hernia inguinalis labialis is that of simple inguinal ruptures. Winckel attempted to keep up a case of pudendal hernia, partly with a Scarpa's pad, and partly with firm rubber rings filling the pelvis as much as possible.

2. **Hæmatoma seu Thrombus vulvæ.**—Blood effusions of this kind arise from trauma apart from parturition. The treatment should be expectant; if the bleeding continue, applications of ice should be used, or the vagina plugged by means of a Kolpeurynter filled with ice water. If the swelling increases and threatens to burst, or absorption is much delayed, or suppuration comes on, then incision, washing out, and plugging with iodoform gauze must be performed.

3. **Inflammatory swellings of, and cyst formation in, Bartholini's glands**—(Cause, Gonorrhœa). *Treatment.*—In the first case, with suppuration, incise and plug the sack with iodoform gauze: in the second case, enucleation of cyst and complete closure of its bed must be performed. If complete extirpation is difficult, the remnant of the sack wall can be sutured to the edges of the incision as recommended by Schröder. If a large incision be used, plugging with iodoform gauze is sufficient to destroy the sack.

4. **Cysts springing from foetal tubal vestiges, or from ectasia of lymph vessels, or from a persistent processus vaginalis peritonei which is closed above**

(hydrocele of the round ligament). The treatment is extirpation or partial excision, and suturing the wound (Schröder).

5. **New growths**—(a) **Papilloma**.—This arises from pointed condylomata, and forms at times masses of growth which are like cauliflowers and as big as fists. The treatment consists in their removal (with suturing if much tissue be removed).

(b) **Elephantiasis vulvæ**.—The cases which the author has seen were all in persons with tertiary syphilis, chiefly prostitutes. Near the growths were ulcers which involved the urethra and more or less had destroyed it. In one case a complete inversion of the bladder had been thus caused. The treatment (after Schröder) is excision, beginning behind and going forwards by steps, the wound being closed at once with sutures. The process often continues. An anti-syphilitic course of treatment is of no use. The ulcers should be treated with lactic acid (Th. Landau). They often produce recto-vestibular fistulæ. In addition to these there are syphilitic and tubercular ulcers of the vulva and vagina; the latter ulcers are always found in conjunction with other tubercular disease, which, as Dohrn pointed out, does not always have its seat in the genitals.

(c) **Carcinoma vulvæ**.—The symptoms at first are often merely pruritus, so that many times it is the onset of sanious discharge which brings the patient to the doctor. In cases where the diagnosis is doubtful, the microscopic examination of a small excised portion is the best means of deciding. The treatment is complete excision and stitching up, and the clearing of the inguinal region.

(d) **Rare new growths**, as lupus, fibroma, sarcoma, melanoma, lipoma, angioma, enchondroma, neuroma.—The growths described by Schröder with characters of elephantiasis, which originate from syphilis, are often taken for lupus. Wherever possible, excision is to be chosen as the operation for lupus.

Chronic Rupture of the Perinæum.¹

Anatomy and Etiology.—Chronic perinæal lacerations are divided into the complete and the incomplete. In the former, the rectum and the sphincter ani are torn through, whilst in the latter only the perinæum itself is partly or wholly torn through. A chronic laceration of the perinæum results, because the recent tear produced in parturition heals up not in a vertical but in a transverse direction, as is commonly seen in the unsutured wound of the perinæum (Fig. 36). A cicatricial union is formed here between the posterior vaginal wall and the lower end of the tear, so that the length of the vulva increases by the length of the tear. Laterally from the posterior vaginal column bands of scar-tissue are seen on the vagina, and these are the remains of the recent tear.

Symptoms.—Every ruptured perinæum causes gaping of the vulva, which is very intolerable to women. The uncovered parts of the vaginal mucous membrane are liable to inflammation and excoriation. Incomplete laceration leads further (see below) to sinking and prolapse of the anterior vaginal wall, while complete rupture produces incontinence of fæces. The mental characteristics are often markedly altered by this trouble.

Diagnosis.—The vulval opening is not closed by the labia majora, the anterior and posterior vaginal walls are

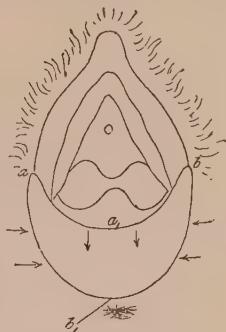


FIG. 36.—Recent laceration of the perinæum (2nd degree). By suturing the tear ab_1 is brought to bb_1 again. Without repair $aa_1 b$ is drawn to $ab_1 b$. The vulva then extends to b_1 .

¹ Recent injuries of the vulva take as a rule in labour, occasionally however also from traumatism (coitus, falling, etc.). They should be united by suturing.

exposed to view and finally prolapse into the vaginal inlet. The perinæum is seen to be shortened or absent. In the latter condition, the hind wall of the vagina comes against the anus, and in complete rupture against the anal mucous membrane, and, indeed, this conjunction in the last condition lies deep below the level of the surface.

Treatment.—The careful treatment of the perinæum in labour, even going so far as incision if necessary, and the immediate suturing of the smallest laceration or incision, is the chief thing in prophylaxis. If primary union does not take place then from the eighth day, secondary stitching is indicated, with vivifying of the wound and scraping away of granulation tissue.¹

The result of these early plastic operations cannot but be good when carried out as indicated under antiseptic precautions and with proper suturing material. Only in complete rupture of the perinæum (the third degree) would the author recommend closure of the tear in the bowel by a continuous buried catgut suture with very short loops, or by means of some buried interrupted catgut sutures. For all lacerations of the first and second degree (incomplete laceration), silkworm-gut or silk sutures are recommended, because the fewer interrupted sutures do not cut through the lacerable tissue so easily as the little loop of the continuous suture, and they also gain a firmer hold upon the skin. Figures 37-45 show various forms of fresh perinæal lacerations of the second and third degree, and the methods of stitching

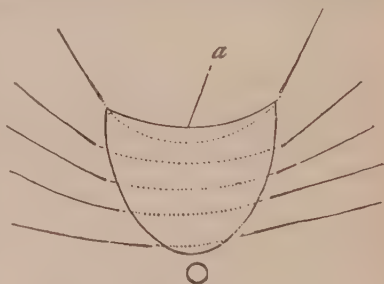


FIG. 37.

¹ [Secondary stitching, if accurately applied, may often result in perfect union of the open, suppurating, granulating surfaces without any revivification of the wound.—J. W. T.]

them up. Fig. 37 shows a perinæal tear of the second degree without a very big vaginal tear: Fig. 38 shows the same drawn together with catch forceps to aid the suturing.

Fig. 39 shows a perinæal tear of the second degree with double-sided vaginal tear: and Fig. 40 the same with one-sided vaginal tear—the point *a* is raised to form a fold, and a suture is carefully passed in order to obtain exact union.

Fig. 41 (complete rupture, third degree, with double-sided vaginal laceration) shows the method of placing the sutures from the bowel.

This method must be chosen when the parts are stitched with silk or silkworm gut. Fig. 42 gives a laceration of the third degree, which has been converted into one of the second degree by buried interrupted sutures passed and

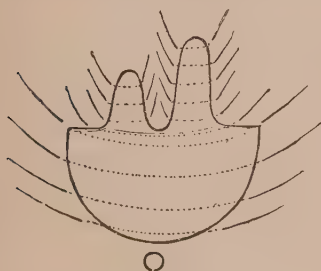


FIG. 39.

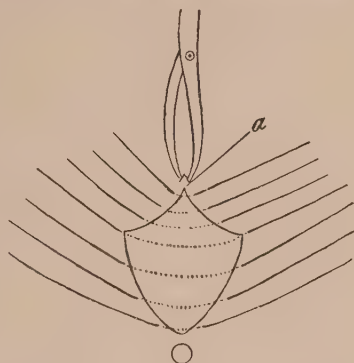


FIG. 38.

tied from the wound surface. These stitches must be passed without including the mucous membrane of the bowel. The continuous suture must be passed in the same way. Figs. 43-45 give the method of using this fully in a case of the third degree.

Chronic lacerations are treated in two ways: (1) by vivifying and suture; (2) by flap-splitting and suture. The first method, that of plastic perinæal operation, was, until very recently, most in use.

The various methods of denuding the mucous membrane are fairly accurate copies of the outlines of the recent lacerations as seen in Figs. 37 to 43.

If the operator agrees with Freund in only excising the scar then in incomplete laceration, the vivified surface

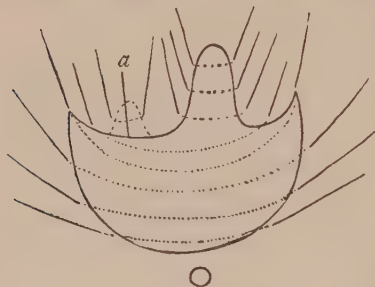


FIG. 40.

is as in Figs. 39 or 40, in complete laceration, as in Figs. 41 and 42. In other cases the surface is denuded as in Fig. 38 in incomplete cases, and as in Fig. 43 in complete cases. The latter shape is modified in tears of the third degree, where the vagina is not

much involved, in so far as the apex of the denudation is not carried so high up in the vagina; on the other hand, the lateral wings are carried further out. By so doing, the butterfly denudation of Simon is obtained (Fig. 46). The union by sutures of this

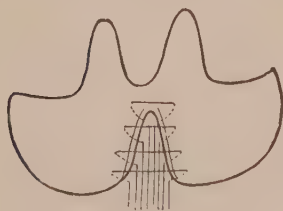


FIG. 41.



FIG. 42.

freshened surface is, especially in complete lacerations, a somewhat complicated business. There must be three rows of sutures—one each from the perineum, the vagina, and the rectum. By the buried catgut sutures

(Fig. 42), and still better, by the buried continuous catgut suture (Fig. 43-45), the stitching is much simplified, but a drawback always remains in this operation in



FIG. 43.

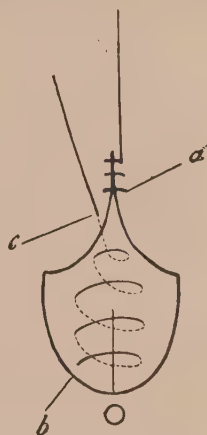


FIG. 44.

that a wound surface is presented to the rectum. This is overcome by the operation of Lawson Tait, which is

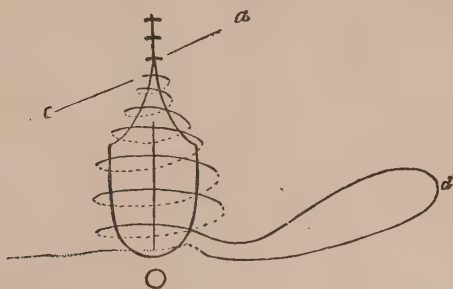


FIG. 45.

described below. Uniting stitches are placed by him from the perineal surface, and the laborious denudation of mucous membrane is done away with. This re-establishes

without loss of tissue, which often causes injurious tension on the sutures, the conditions of a recent perineal laceration.

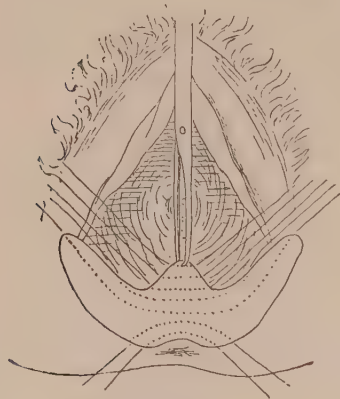


FIG. 46.

The cicatricial line of union between the hind wall of the vagina and the rectal wall is cut through in this operation (Fig. 36 ab_1b), the vaginal wall is raised to its former level (aa_1b), and the lateral parts of the laceration (ab_1 , bb_1), which should have grown to one another after the original recent tear, are brought together with sutures. From this view the method of Lawson Tait seems to the author

the ideal one of perineoplastic operations.

As after-treatment of plastic operations on the perinæum and vagina, the author orders fluid diet for the first three days, and then aims at liquid motions by castor oil and small enemata. The patient must lie in bed at least twelve days. After each passing of water the perinæum should be washed with a 1 per cent solution of lysol, and dressed with sterilised iodoform gauze. Vaginal douches are only given when there is much discharge.

[NOTE.—It has always been the custom in Birmingham, after perineoplastic operations, to keep the bowels acting freely from the first.—J. W. T.]

Coccygodynia.

Coccygodynia is the name given to severe pain in the coccygeal region. Inasmuch as it has been oftenest observed after labour, it has been attributed to injury during labour, and it has been accepted that the seat of

the mischief lies in the coccygeal joints. According to Graefe this is not the case in the majority of instances. For if the coccyx and its joints be examined from the vagina, and from outside, without moving them, no pain is evoked in the cases named, and pain only arises when the soft parts coming from the coccyx are thus examined. Graefe therefore considers that in most cases the true cause is due to the injury of the fifth sacral and the coccygeal nerves. The success of Seeligmüller's treatment by faradisation, which cures the condition after three to twelve applications, supports this view. This method of treatment should be preferred to the uncertain results of cutting round or removal of the coccyx. Olshausen, however, prefers the two latter methods to all others.

DISEASES OF THE VAGINA.

Inflammation of the Vagina (Kolpitis or Vaginitis).

THE most frequent cause of vaginitis is gonorrhœa. This produces almost always the very acute form of the disease in which we find the vagina vividly inflamed, swollen, very painful, with a copious purulent discharge upon its surface. On the introduction of the speculum bleeding is produced. Apart from gonorrhœa, such acute states only arise from the presence of foreign bodies in the vagina (pessaries, neglected tampons, sponges, worms, and the like), from the use of too hot and too long continued injections despite the increasing tenderness, from sanious discharge in the later stages of cancer, and from the use of strong caustics. The chronic forms, which are by far the most common, are met with from defective vaginal closure and from increased uterine secretion, which brings on a rapid epithelial desquamation. The vaginal discharge has a peculiar creamy appearance. The anatomical condition in this chronic form, according to C. Ruge, consists of scattered small-celled infiltration of the papillæ which have cast off their epithelium down to the deepest layers (kolpitis granularis). At the menopause the so-called kolpitis senilis often comes on, in which the papillæ throw off their epithelium completely, and thus adhesions are produced in the vagina (vaginitis ulcerosa adhesiva). Both forms are recognised by the spotted dark redness of the vaginal mucous membrane. The senile kolpitis, in addition to causing a free purulent discharge, produces severe burning pains and

itching. Diphtheritic, or croupous, kolpitis is seen in infectious diseases with gangrene of the vulva.

Treatment.—Since the various forms of kolpitis are either of infectious origin or owe their long existence to the influence of micro-organisms present in the vagina, they should be attacked by antiseptic means. The most useful solutions in the acute gonorrhœal form are 1 per cent of lysol, or 1 in 1000 of corrosive sublimate used once a day as vaginal douches. After careful drying of the vagina with lint on a holder through a speculum in order to prevent poisoning, a strip of iodoform gauze is introduced and left in the vagina. When the patient cannot come so often to see the doctor, washing out with 1 per cent zinc chloride solution at 37°C . (98.6°F .) must be ordered twice a day. In the manifold gonorrhœal vulvo-vaginitis of little children the author has seen the best results from the injection of a 10-20 per cent solution of silver nitrate two or three times a week by means of Braun's syringe, followed by a 3 per cent solution of common salt to neutralise it. In the chronic forms, dilute acetic acid is the surest and quickest agent. This is poured into the vagina through a Fergusson's speculum two or three times a week, after douching with solutions of 1 per cent lysol or 1 in 1000 corrosive sublimate, and by gradual withdrawal of the speculum it is brought into contact with the walls of the vagina on every side. The lowest segment of the vagina is then mopped with lint squeezed out of the acetic acid. The residue of the acetic acid is removed by repeated douches of simple water or of 1 per cent solution of lysol. From a consideration of the etiology, it is seen that the discharge, which comes from above and runs downwards, must be tackled at its source. General treatment has also its rôle. In chlorosis, the discharge which is so much complained of can usually be stopped by giving iron. In this way the local examination of virgins may be avoided. The latter should never be resorted to unless absolutely necessary. Other indications for the treatment of vaginitis are plainly evident when the etiology is carefully considered.

Swellings and Tumours of the Vagina.

Herniæ, hæmatomata, and cysts have been already mentioned (see p. 62).

A multiple formation during pregnancy of little cysts filled with gas has been described by Winckel as kolpo-hyperplasia cystica. Their contents, according to Zweifel, consist of trimethylamine, which is also present in the vaginal secretion of pregnant women, and he says that they are derived from dilated vaginal glands. Treatment is unnecessary. Pointed condylomata are found in the vagina, even as high as the portio vaginalis, but they do not form such large growths as those outside the vagina.

Of true tumours, arising primarily from the vagina, we may mention fibroma, carcinoma, and sarcoma.

The treatment consists in total removal, wherever possible, with wide cutting into healthy tissue and filling in of the gap by plastic operations.

Vesico-vaginal and other Fistulæ of the Genitals.

These arise most commonly from long-continued pressure of the fœtal head in labour, and less frequently from extraction with forceps. Still less frequently they may arise from operative methods, by which the vesico-cervical or vesico-vaginal wall is cut through, such as turning and perforation. They may also arise from vesical calculus and ulceration, and from the use of pessaries.

The commonest form is the vesico-vaginal fistula; if it involves the anterior cervical lip then one speaks of deep or superficial vesico-utero-vaginal fistula. If the opening lies above the intact os uteri, then it is termed a cervico-vesical fistula. In addition we find urethro-vaginal and uretero-vaginal as well as uretero-uterine fistulæ. The

uretero-vaginal fistulæ arise now and then in connection with vaginal total extirpation of the uterus.

Fistulæ vary very much in size. They can be as small as a pin's head or as large as the palm of the hand.

The symptoms of fistulæ come on (when the latter is not due to direct laceration) a few days after the confinement. In urethro-vaginal fistula the urine is retained and cannot be passed in the usual stream, but runs out of the vagina. In vesico-vaginal fistula the urine dribbles out of the vagina continuously and involuntarily. If the catheter be used the bladder is found empty. This is the case also with the various vesico-uterine fistulæ.

In the uretero-genital fistulæ, on the other hand, the patient passes water from time to time voluntarily; on passing the catheter, urine is found in the bladder, but urine also dribbles away continuously from the vagina. The continuous wetting with urine of the vagina and the parts around the external genitals produces intense inflammation and eczema. As a result of urinary decomposition the patient gives off a urinous odour. The disease invalids the patient and renders her incapable of getting about.

The diagnosis is at once known from the patient's account, and the only difficulty is to discover the site of the fistula when this is small and surrounded by cicatricial tissue.

Larger fistulæ are to be made out with the catheter and finger, whilst the smaller ones are sought out by the aid of Sims' speculum and the use of a small sharp hook to draw the parts asunder. If the fistula cannot be found, then milk is injected into the bladder, and this trickles out of the mouth of the fistula, or in vesico-cervical fistulæ from the os uteri. It is only in cases of uretero-vaginal fistula that the injected milk remains in the bladder.

The prognosis of fistula has become a good one, owing to the improvement in treatment. Only in a few specially complicated cases is the direct closure of the fistula

impossible. Many fistulæ, the cervico-vesical fistulæ specially, heal spontaneously under the use of caustics.

Treatment.—In small and recent fistulæ an attempt to cure with caustics should be made. For this a self-retaining catheter must be used to allow the urine to run off continually.¹ If these attempts fail, or the fistula is large then the edges of the fistula must be vivified freely with the knife and united with sutures. The elements necessary for success are accessibility of the fistula, sufficient freshening of its edges, exact suture, and careful antiseptis. As a result of a correct estimation of the value of the first three points, Sims and Simon had great success, even before the antiseptic period.

For exposing the fistula to free view the most varied postures have been invented, as the side position, the knee, elbow, and the elevated lithotomy positions. The last suffices for most of the cases. By means of Simon's specula the fistula is brought into view, and the operator uses a sharp hook or volsella to spread out the region of the fistula. When the fistula is surrounded by scar tissue a long preparatory course is necessary, by which the cicatricial bands are partly cut through and partly stretched with hard rubber cylinders or balls (after Bozemann).² Any vesical catarrh must be removed before operation by preparatory treatment, including injections into the bladder. The freshened surface has generally an oval shape, and lies transversely with the fistula in its middle. The margin of the wound, which is marked out previously with the knife, lies about 1-2 cm. ($\frac{2}{5}$ to $\frac{1}{2}$ inch) from the edges of the fistula. From the marked-out wound margin a tenotomy knife, of which there must be several with blades at different angles, is pushed through deeply into the fistula, but just missing the vesical mucous

¹ [The retained catheter may, of itself, induce healing in a recent fistula. When this treatment is adopted two catheters must be used (preferably the short bulbous-ended catheter of Skene), and the instrument must be changed every night and morning. Many surgeons always use Skene's catheter for two weeks after operation.—J. W. T.]

² This applies to vaginal contraction preventing accessibility.

membrane (Fig. 47), and it then is made to remove the whole of the tissue lying in the area to be vivified (Fig. 48).

When this is impossible, any remaining islets of vaginal mucous membrane must be cut away with the scissors.



FIG. 47.

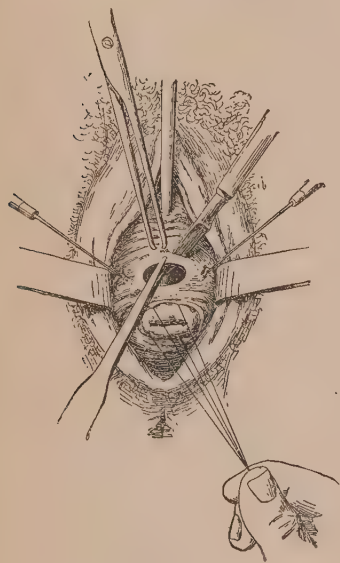


FIG. 48.

If the mucous membrane of the bladder crowds into the fistula it must be held back by a catheter from within the bladder. Continuous irrigation or frequent sponging is used to cleanse the wound from blood. More simple than the vivifying method is the method of flap-splitting,¹ which has been recently practised. After stretching the fistula in any given direction, an incision is made over it in the direction of the extension, the edges of the wound near the fistula are seized and drawn away from the margin of the fistula, and then undermined for about 0·75 cm. ($\frac{1}{3}$ inch) (Fritsch).

¹ [On flap-splitting as applied to vesico-vaginal fistulæ:—This method, which has been popularised by Lawson Tait, is especially applicable to fistulæ of large size, as no tissue is removed. The edge of the fistula is thoroughly split by a small scalpel, the flaps are everted, and silkworm-gut sutures are passed at short intervals by a long-handled needle. The sutures close the fistula, if possible, in a transverse direction. At each end of this transverse wound a semicircular buried suture of silkworm-gut is passed beyond the level of the split, and on tying these, complete spreading out of the flaps is necessarily obtained. The success of the operation depends largely upon the careful passing of these sutures at the angles.—J. W. T.]

The vaginal wall is separated from the bladder wall all round the fistula. The wound has the same oval shape as after vivifying (Fig. 49). The stitches are put in at intervals of from $\frac{1}{4}$ to $\frac{1}{3}$ cm. ($\frac{1}{10}$ to $\frac{1}{8}$ inch). They are entered right at the edge of the wound, and carried under its whole surface. Where the tension is great, sutures are inserted $\frac{3}{8}$ to $\frac{1}{2}$ cm. ($\frac{1}{7}$ to $\frac{1}{5}$ inch) from the wound margin to relieve the tension (Simon) (Fig. 50).



FIG. 49.

The sutures which close the fistula must pass from without inwards above, and from within outwards below. The mucous membrane of the bladder must on no account be included (Fig. 47). The sutures are not tied until all have been passed, and those passing through the fistula are tied first, so that if one of the thin sutures gives in tying another can be passed at once without difficulty.

The two assistants who have charge of the volsella and the tenacula (the speculum should be held by a nurse sitting behind one assistant) must sort the threads most carefully, so that the operator may not tie two false ends together. The right and left assistants draw the threads of their own sides towards themselves. The right assistant must at the moment of tying draw the edges of the wound together with forceps to insure exact apposition. Before this the upper and lower tenaculum forceps or hooks, or the ligatures as used by Simon for drawing open the cervix, must be removed. After tying all the

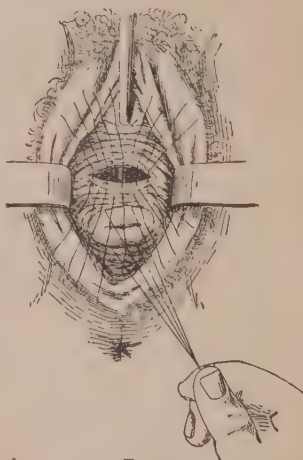


FIG. 50.

sutures, superficial ones are put in. Then 200 gr. (4 ounces) of water are injected into the bladder in order to see if the latter is water-tight. The sutures are cut, the wound sponged clean and dusted with iodoform. A strip of iodoform gauze is laid in the vagina. The material of the sutures is of no importance so long as it is aseptic. Firm suturing material, such as wire and silkworm gut, have perhaps the advantage over silk, in that they do not carry matter into the wound as silk does.

The after-treatment consists in interfering as little as possible (Simon). The catheter is only used when the patient cannot pass her water. The lateral position, frequent micturition, and keeping the motions loose are all useful aids. The patient must keep her bed at least eight days. From this time the sutures are gradually removed. Even after closure of the fistula incontinence often remains, because the bladder has lost its power of extensibility, or the sphincter has atrophied or been injured. In the first condition Hegar has obtained a cure by continuously increasing distensions of the bladder. In the latter conditions the operations of Winckel and B. S. Schultze come into consideration—these produce narrowing of the urethra and the neck of the bladder by removing an oval segment of the urethro-vaginal septum, with or without the inclusion of urethral or bladder mucous membrane.

It is only in very bad vesico-vaginal fistulæ, and even then only when they are specially complicated, that either this or the flap operation is not perfectly successful. Kolpokleisis is then indicated (Simon) at a lower level in the vagina.

A ring of tissue 1.5-2 cm. ($\frac{3}{5}$ to $\frac{4}{5}$ inch) broad and 3 mm.

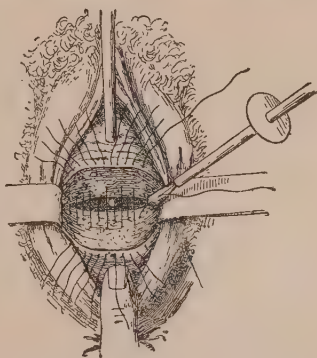


FIG. 51.

($\frac{1}{8}$ inch) thick is removed and the surface sutured, the sutures uniting the anterior and posterior walls rather than the lateral walls (Fig. 51). In a similar manner in uretero-vaginal fistula an oblique obliteration of the vagina may be carried out.

Kolpokleisis has a great disadvantage in that it prevents coitus, and calculi form readily in the part of the vagina cut off. Similar objections apply with increased force in obliteration vulvæ rectalis, the operation which Rose has described for complete destruction of the urethra. In this operation the meatus urinarius and the vulva are closed after a recto-vaginal fistula has been established; just as in treating a uretero-vaginal fistula a vesico-vaginal fistula is made. These artificial fistulæ have a great tendency to close, so that a big piece of mucous membrane should be removed and the wound margins sutured.

Perhaps the decomposition of the urine in kolpokleisis and in Rose's operation may be avoided by washing out daily per urethram and rectum respectively.

If after splitting the cervix a cervico-vesical fistula does not heal on treatment, then hysterokleisis is indicated. In uretero-uterine fistulæ nothing but removal of the kidney of that side has been effectual (Zweifel, B. Crédé). Guserow has also performed nephrectomy with success in a case of uretero-abdominal fistula as recommended by Simon. The patient is still in good health after six years.

Fistulæ of this kind may arise after the removal of intra-ligamentary tumours by laparotomy.

Of late one may hope with some assurance that Kolpokleisis will entirely disappear from the text, owing to the new methods of operating of Trendelenburg, Bardenheuer, and the author. Trendelenburg lays open vesico-vaginal fistulæ by section from above. Bardenheuer, without opening the bladder, separates, by an incision above the symphysis, the adhesions of the walls of the fistula to the pelvic bones, and thus renders possible the suture of the now movable walls of the fistula.

The author believes that he has found a sure way of

healing uretero-vaginal fistulæ. This he carried out as follows:—An elastic catheter was introduced into the ureter, and the vagina was freed upward and downward by flap-splitting from the fistula (Figs. 52 and 53). At the bottom of this wound an opening into the bladder



Fig. 52.

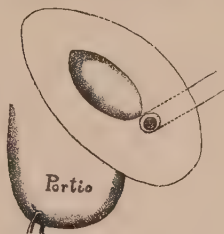


FIG. 53.

was made which reached up to the mouth of the ureter (Fig. 53). The ureteral mucous membrane was now stitched with fine silkworm sutures to the vesical mucous membrane, the ureteral wall was then split for 2 mm. above these ligatures upon a curved director introduced into the ureter, and was again stitched to the bladder in the region of this cut, mucous membrane being applied to mucous membrane. In this way the uretero-vesical wall (Figs. 52, 53) was split for about 1 cm., and the wounds stitched up with seven silkworm sutures (Fig. 54). The ureter now opened once more into the bladder directly (Fig. 54), and perhaps 1 cm. away from the vesical opening. An artificial vesico-vaginal fistula suitable for suturing was thus made, the mouth of the ureter was widely removed from the bladder opening of this fistula. This opening was also sutured with interrupted

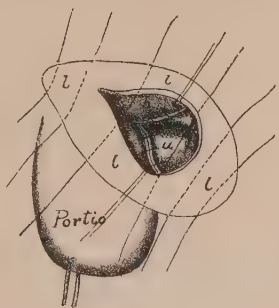


Fig. 54.

silkworm sutures. The ureteral catheter was previously passed through the bladder and urethra outwards and remained in two days. Quick healing took place. A cystoscopic examination later showed the new ureteral opening to be three times as large as the right one. The inner silkworm sutures gradually appeared in the vaginal scar. They should therefore be replaced by catgut sutures. This method has these advantages over other methods, that by its failure a simple vesico-vaginal fistula is left which can be closed easily in one or two sittings, and that the ureteral opening, which is often stenosed, is widened. For the cure of uretero-uterine and uretero-parietal fistulæ, the author performed abdominal section, and stitched the ureter "over a self-retaining catheter" into the bladder (uretero-cystotomy) and ligatured the peripheral end of the ureter.

Recto-vaginal fistulæ, which arise from defective union after rupture of the perinæum, from abscess breaking both ways, and from injuries,¹ are vivified just as vesico-vaginal ones when they are high in the vagina. But when lower down, the vivifying may be done, as in a prolapse operation, all round the fistula, or the whole perinæum

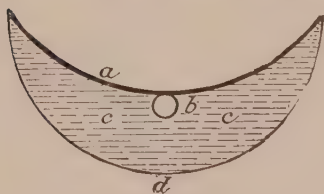


FIG. 55.

from the fistula may be divided, the walls of the fistula freshened, and the case treated like a perinæal rupture of the third degree.

For ano-vestibular fistula, Fritsch has described a method by which (Fig. 55)

the freed flap *a* is drawn over the freshened surface *c* and united with *d*.

¹ A case came under observation in Gusserow's clinic in which there had been originally suppuration of Bartholini's glands. In a second case vesico-vaginal and recto-vaginal fistulæ were due to criminal abortion. The recto-vaginal fistula was cured first and with one operation, the vesico-vaginal fistula only after many operations.

Vaginismus.

Marion Sims, who first described this disease, defines it as being excessive hyperæsthesia of the hymen and the vaginal entrance, combined with such strong involuntary spasmodic contractions of the sphincter vulvæ that coitus cannot be accomplished. Sometimes the mere touch with a feather will produce such acute pain that the patient cries out.

The most marked cases of vaginismus seen by Sims had no inflammatory complications. Impotence of the husband is a frequent cause of vaginismus.

Vaginismus produces much unhappiness in married life, and many psychoses in women. Cure is only obtained by excising the hymen, in which Winckel has repeatedly found fibrous hypertrophy of the stroma with papillary growths of the epithelium. The excision of the hymen is carried out as follows: The portion attached to the urethra in front is seized with forceps, and the hymen is cut off in a continuous piece with knife or scissors all round until the urethra is again reached. If the hymen ascends over the urethra the whole rim of the meatus must be removed, so that the excised piece has the following outline (Fig. 56).



FIG. 56.

The figure is interesting from the fact that on one side a defect is seen in the removed hymen. This marks a small bit of hymen left behind by Sims, which continued the vaginismus. It was only on removal of this piece that a definite cure was obtained. The wound produced should be sutured and the vagina plugged with iodoform gauze. Simple dilatation will not cure vaginismus. This is proved by those cases in which after conception under anæsthesia and consequent childbirth the vaginismus has again returned. A similar set of symptoms arise from inflammation of the vaginal entrance, following the first

inapt attempts at coitus when the parts are small, or after gonorrhœa.

In these cases, which should not be confounded with those described by Sims, the suffering is removed by curing the inflammation, by dilating the vaginal entrance, and by increased experience on the part of the husband. A simple contraction of the muscles of the pelvic floor constrictor cunni et levator ani in hysterical and neurotic subjects without any hyperæsthesia of the vaginal inlet, leads to the state which Hildebrandt has described as "penis captivus." Here a constitutional treatment is the only resource.

THE GENITAL ATRESIÆ.

ATRESIA is congenital or acquired. Congenital atresiæ are as follows:—

Atresia hymenalis.

Atresia vaginalis.

Atresia uterina.

Atresia hymenalis is, according to Dohrn, often mistaken for atresia vaginalis. Atresia uterina is very rare. In atresia vaginalis the vagina may be wanting in whole or in part, or it may be closed only at one spot by a septum. Naturally the former conditions are much more difficult to treat. The acquired atresiæ are either vaginal or uterine. This leads to collection of mucus or pus (hydro- and pyo-metra).

Vaginal atresiæ arise from inflammatory or ulcerative processes in the vagina. The uterine atresiæ also arise from inflammations in the puerperium, from infectious diseases, and from the use of severe caustics. In old women an atresia of the internal os is found analogous to the colpitis adhesiva. This leads to the collection of mucus or pus (hydro- and pyo-metra).

Symptoms.—In all cases of atresia, menstruation is absent, and in its place at the time of puberty pains come on which are at first periodic and then become more continuous. These pains are caused by retention of the menstrual fluid. Since pains of this kind without menstruation are often met with at the beginning of puberty even in normally formed girls (ovarian dysmenorrhœa), it frequently happens that a case of con-

genital atresia is not examined for a long time. With symptoms of this kind the medical man should always insist upon an examination. The greater the collection of the fluid becomes, so much the more does obstruction to defæcation and micturition ensue. On examination the vagina is found distended (hæmato-kolpos), but it is only after long duration that the cervix is also distended

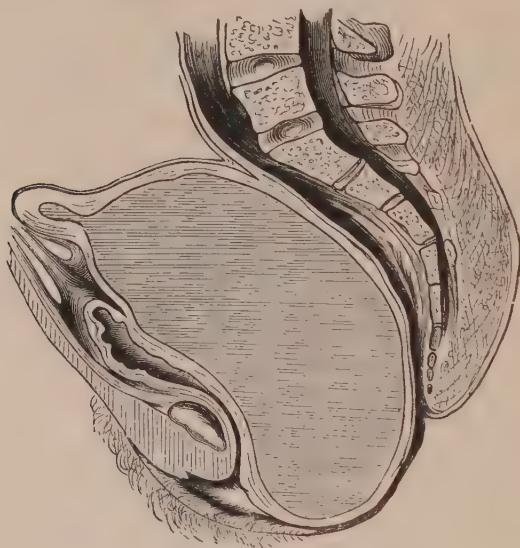


FIG. 57.—Atresia hymenalis (after Breisky).

(hæmato-metra, Fig. 57). When atresia uterina is present a primary hæmato-metra is formed. The greater the distension of the uterus the more danger there is of blood distension of the tubes also (hæmato-salpinx).

From the description given diagnosis is easy. In atresia hymenalis and vaginalis the obstruction is evident. It is pushed down and often allows the blood to be seen through it. By the combined recto-abdominal examination

a tumour filling the pelvis is felt, and upon this there lies a small swelling. This is the uterus. In many cases the distended tubes are to be felt as sausage-shaped bodies close by. The examination must be made very carefully, as the tubes may be ruptured, and fatal peritonitis may ensue.

In primary hæmato-metra the uterus is felt by the bimanual method of examination as a tense elastic tumour, the cervix is effaced, and there is no os uteri. In atresia at the internal os the cervix is present, but a round elastic tumour is felt in the position of the uterus, and the sound does not enter its cavity. The prognosis is bad unless skilled treatment be adopted, because the blood cysts may rupture. Most commonly the tubes burst, and as a rule the patient dies of peritonitis. Spontaneous cure only takes place when the obstruction itself yields, or a very premature menopause sets in.

The treatment is simple only in those cases where as yet no hæmato-salpinx sac has formed and the vagina is present; for the closing septum is then but thin. In these cases the septum should be split by a small incision, so that the collected blood may flow away slowly. A small incision is preferable, because it is possible for a hæmato-salpinx to have escaped palpation. When the outflow is more rapid, and especially if pressure from above be used, the tube sacs may be torn (owing to the downward displacement of their uterine ends) at their abdominal ends, which are more or less fixed by adhesions. In such a case the abdomen would nowadays be opened, and the tubes and ovaries removed. In the same cautious way one proceeds in opening hæmato-kolpos and hæmato-metra, where, owing to the thickness of the obstructing membranes, difficulties arise. These difficulties can be overcome by working in the middle line between the bladder and the rectum after incising the outer skin, until the blood sac is reached.

For this purpose a catheter must be placed in the bladder, and the operator's left forefinger in the rectum.

With the finger or with a trocar the blood sac is opened and the canula is left in or a drainage tube is introduced. The decomposition of the retained fluid is prevented by applying antiseptic pads to the vulva, and by changing these frequently. The channel thus formed is best kept open by plastic covering of its surfaces. Even after a hæmatokolpos or a hæmatometra has been opened, immediate salpingotomy (the removal of the tubal sac by laparotomy) may be necessary in those cases when the tubes do not pour their blood into the uterus, or when the sausage-like sacs retain their size unchanged while the uterus diminishes, or when they suddenly disappear without at the same time any corresponding amount of blood being passed below, or when rupture has taken place with escape of blood into the peritoneal cavity. The prognosis of genital atresia with hæmato-salpinx can be much improved by salpingotomy, as the cases of Leopold, Kehrer, Czerny, and others prove, while Fuld's researches show the simple vaginal operation in cases similarly complicated to have a mortality of 70 per cent (39 deaths in 56 cases). Atresia of the internal os is treated by simply passing a sound or trocar through the obstruction.

Atresia, with Doubling of the Genital Canal.

These atresia receive special mention because their diagnosis is very difficult. The symptoms consist of pain, as previously described, but menstruation is present. On examination in case of doubling of the whole genital canal there is found an elastic swelling adjacent to the vagina and uterus, and adjacent to the uterus alone in case of doubling of the uterus (Fig. 58). The absence of the vaginal fornix on the side of the swelling and the semi-circular shape of the os uteri, with its concavity directed towards the swelling, are very characteristic signs. The prognosis in these cases, when allowed to take their course, is not so grave as in the other forms, because rupture

takes place into the other half of the genital tract with greater ease. The treatment is much the same as in the more usual atresiæ. In case of hæmato-metra in a rudimentary horn of the uterus laparotomy is indicated. It is only by laparotomy that the correct diagnosis can be established in many cases, for unless the inclination of the fundus uteri towards the other side leads the surgeon to diagnose a uterus unicornis, and in consequence of this to diagnose the tumour correctly, the presence of a pediculated swelling in the broad ligament (such as is the

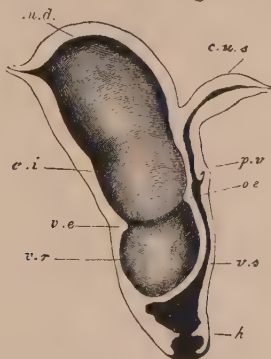


FIG. 58.—Schematic coronal section of hæmato-metra and hæmato-kolpos laterales dextræ (after Breisky). *c.u.d.*, right uterine horn; *c.u.s.*, left uterine horn; *o.e.*, external os; *c.i.*, internal os of the dilated cervix of the right side; *v.e.*, blind saclike rudiment of the right vagina protruding into the open left vagina, *v.s.*; *p.v.*, vaginal portion of left cervix; *h.*, Hymen.

characteristic formation in these cases) would lead him to think rather of an ovarian tumour. Four successful cases (Schröder, Leopold, Kehrer, Czerny) prove that laparotomy is indicated in cases of hæmato-metra in rudimentary uterine cornua with hæmato-salpinx, while of 10 similar cases operated upon from the vagina only one survived (90 per cent mortality). In laparotomy it is best to leave the sound appendages behind. If castration is performed, we do not usually require to perforate the hæmato-metra.

DISEASES OF THE UTERUS.

Malformation and Defective Development of the Uterus.

1. Complete Absence or Rudimentary Formation of the Uterus.

(a) *With Absence of the Ovaries.*—Patients so affected when viable are cretins without distinctive sexual characters.

(b) *With Presence of the Ovaries.*—Patients so affected are of normal female habit and inclination. In rare instances severe pain (menstrual moulins) comes on periodically, produced by the ripening of the ova. In these cases the vagina may be entirely absent. The urethra and the rectum are sometimes utilised in coitus.

Such patients are of great concern to the practitioner whom they consult for amenorrhœa, impossibility of coitus, sterility, and for dysmenorrhœa. For making a diagnosis the bimanual examination by rectum and abdomen is necessary, because the vagina is wanting. If necessary this may be done under anæsthesia. In a case of rudimentary uterus one feels a band running length or cross-wise, or a T-shaped body, the legs of which represent the ununited remnants of the uterine horns. Near these one may often feel the ovaries.

Treatment.—Since such patients are often married, the making of a passage with the knife between the bladder and the rectum has been undertaken, and by

laying gauze in it, or by turning flaps of skin from without into it, attempts have been made to keep it open in order to permit of coitus. Sterility cannot, of course, be cured. Should the menstrual molimen be excessively painful, castration is indicated.

2. Congenital Atrophy of the Uterus.

In this condition the uterus has its normal shape, that is to say, the cervix is not longer than the body, but the uterus, as a whole, is smaller than normal, and its walls are very thin. This congenital hypoplasia is commonly found, according to Virchow, in those severe forms of chlorosis which are associated with congenital smallness of the heart and aorta. This is a malformation just as much as *uterus rudimentarius*. If there is any development of the ovaries the menstrual molimen, with scanty but distinct menstruation, takes place. The symptoms which cause the patient to consult a surgeon are amenorrhœa, or scant and infrequent menstrual molimina, and in married women, sterility.

An exact diagnosis of the state is made by measuring the uterus with the sound, when a length of $5\frac{1}{2}$ cm. (2·0 inches roughly) or less is found.

3. The Fœtal or Infantile Uterus.

This is characterised by its smallness, but differs from congenital atrophy in the abnormal length and thickness of the cervix in comparison with the thin-walled body. These points are easily made out bimanually. The possessor of such a uterus often presents a very childish bearing. The hair of the *mons veneris* and of the axilla is wanting, the vulva and vagina are narrow, the breasts badly developed, and menstruation is absent as a result of defective development of the ovaries. It is this last sign which causes the patient to seek advice. Differences

exist as to the treatment of congenital atrophy of the uterus and of foetal uterus. While most authors hold all treatment as useless for foetal uterus, Gusserow is of quite the other opinion. He says that all treatment is useless in congenital atrophy of the uterus because we have there to do with a malformation. But in foetal uterus, if the uterus has the infantile form, as characterised by the preponderance of the cervix over the fundus, we have to do with a failure of development only. An increased development of the uterus is to be aimed at by the use of hot douches, and especially by faradisation¹ of the uterus. One pole is placed within the uterus. The general health must be raised by suitable nourishment and careful hygienic conditions. In chlorosis iron must be given. Marriage very often renders other treatment unnecessary. The diversity of opinion already mentioned is easily explained when we find that various transitional forms between the uterus foetalis and the uterus atrophicus are met with. It would therefore be well to try the treatment in both conditions in case there be no corresponding arrest of development of the ovaries.

Stenosis of the Uterus.

Stenosis of the uterus concerns its lower segment, the cervix—and there are isolated stenoses of the external os, of the whole cervical canal, and more rarely of the internal os uteri. Stenosis may be congenital or acquired.

Congenital stenosis of the external os occurs under two conditions—stenosis in a normal sized uterus, and stenosis in an atrophied uterus. In congenital or acquired stenosis of the whole canal the external os is naturally stenosed also. Congenital stenosis of the whole cervical canal is generally accompanied with elongation of the cervix, which lies in the axis of the vagina, with the small strongly ante-

¹ This is very useful in the acquired uterine atrophy caused by repeated or too long continued lactation. The uterus becomes larger, and menstruation comes on.

flected uterine body resting upon it (the anteфлекted uterus is in a position of retroversion). We have here to do with an infantile uterus and inflammatory hypertrophy of the cervix.

Acquired stenoses are most commonly caused by intrauterine caustics,—when care has not been taken to completely remove the excess of caustic by washing the uterus out after its use,—also by cicatricial contraction as a result of ulcerative processes in the neighbourhood of the os uteri, from extensive lacerations in labour, and from operations. Even amputation of the portio, which is recommended generally to cure the stenosis, may produce cicatricial growth of this kind, so that stenosis of the external os results. Finally the too free plastic closure of a cervical laceration (Emmet's operation) may have the same effect.

Inflammatory swelling of the cervical mucous membrane also produces a contraction of the cervical canal, as does senile involution of the whole uterus. In the latter case the stenosis, in women who have borne children, affects the internal os only, since in multiparæ the lower section of the cervix is permanently more dilated.

There is also a *relative* stenosis, which consists in the cervical canal being perhaps normally dilated, but with abnormally copious or viscid secretion of the uterus. Retention of the secretion takes place, as in stenosis of the cervix; this leads to secondary dilatation of the cavity of the body of the uterus if corporeal catarrh is present, or to spindle-shaped dilatation of the cervical cavity in cervical catarrh.

Finally, there are *temporary stenoses* of the internal os uteri, which come from application of caustics to the cervical mucous membrane and from clumsy use of the sound. These are due to contraction of the muscular fibres of the inner os. Without contraction of this kind stenosis of the internal os may be suspected wrongly when the sound is not pushed in the direction of the uterine cavity.

Symptoms.—These are dysmenorrhœa and sterility, and Sims says that they are due to the stenosis preventing the escape of menstrual fluid and the entrance of spermatozoa. The retention of blood leads to painful contractions of the uterus. This uterine colic may come on apart from menstruation in connection with catarrhal inflammation and stenosis, and arises then owing to the obstructed outflow of the catarrhal secretion. Sterility is not absolute, since spermatozoa can, by their smallness and activity, make their way through an abnormally narrow os uteri. It is more commonly caused by inflammation of the uterine mucous membrane, or defective development of the whole uterus and ovaries which accompanies the stenosis.

But there certainly is a difficulty thrown in the way of conception by the various stenoses, if only because they hinder the normal eversion and consequent retraction of a fringe of cervical mucous membrane during coitus, which thus becomes laden with spermatozoa. As a result the spermatozoa stay longer in the vagina, where the acid mucus kills them.

Dysmenorrhœa and sterility occur also in a series of other gynæcological affections, especially diseases of the appendages of the uterus, and in defective development of the whole uterus or ovaries.

The diagnosis of stenosis should never be made from the history only, but by means of a sufficient combined examination one should make out the size of the whole uterus, the condition of the tubes and ovaries, and of the pelvic peritoneum and cellular tissue. If nothing abnormal is found in these parts the possibility of stenosis may be entertained.

Diagnosis.—With the exception of relative stenosis, the os uteri is so narrow at times in *stenosis of the external os* that one can scarcely feel it with the finger, and one can only recognise it in the speculum as a small dimple. When this high degree of stenosis is present the diagnosis is established in every case, even when the uterus is

abnormally small; while a slight stenosis in an abnormally small uterus is only a symptom of the want of development of the whole uterus. Every stenosis of the external os uteri, including relative stenosis, is recognised by secondary dilatation of the cervical canal, which appears to be distended, like a bladder, by retention of the tough secretion. According to B. S. Schultze's careful measurements, a sound of 4 mm. thickness should pass the normally sized canal without difficulty if properly directed. We may further take stenosis of the external os as established if, in a uterus of normal size, a sound point 4 mm. thick cannot be passed, or can be passed only by using considerable force.

By using the sound mentioned we can discover stenosis of the *whole cervical canal*. This is present if the 4 mm. sound cannot pass through the cervical canal.

Stenosis of the internal os uteri is diagnosed when the practitioner finds that in spite of careful use of the sound, in spite of bending it to suit the curve of the uterine axis, and in spite of pushing the sound forwards in the direction of the uterine canal, notwithstanding the fixation of the uterus with the volsella, an ordinary sound of 4 mm. cannot be passed at all or only with some forcing after repeated attempts.

As regards prognosis stenosis does not endanger life, but it may cause suffering of many kinds, which finally renders the woman a permanent invalid. Menstruation is painful from its onset, and the patient has to keep her bed. As a result of retention of the secretion, endometritis with increased secretion sets in, and uterine colic now comes on which causes dysmenorrhœa apart from menstruation. By the more or less continuous cramp-like pain the whole constitution, and specially the nervous system, is sympathetically affected—neuroses of the most varied character arise. The endometritis also spreads to the parenchyma of the uterus, to the peritoneum, and the ovaries. Thus, in addition to endometritis there arise, as a result of stenosis, metritis, perimetritis, oophor-

itis, and perioophoritis. These lead to increased menstrual blood-flow and the onset of fresh pains.

Treatment.—Before the treatment of stenosis is undertaken one should find out whether with the stenosis the above-mentioned consequences are present or not. In recent febrile perimetritis all manipulations are contra-indicated. If, on the other hand, old perimetritic adhesions of the ovaries, or perimetritic bands fixing the uterus, are present, the patient should be anaesthetised in order to free the ovaries bimanually from their adhesions, and to stretch or tear down the bands. When endometritis is present with the stenosis, one should endeavour to cure them both at once, the endometritis by curetting. The *uncomplicated* cases of *slight stenosis* are very simple to treat. They occur in young girls soon after the onset of menstruation. The simple introduction of a sound into the uterus is often sufficient in these cases to remove the dysmenorrhœa, and on marriage this enables conception to take place.

In *more severe* stenosis active treatment is indicated. In stenosis of the external os this consists in bilateral discision and suture of the surfaces of the incision, and this certainly cures the stenosis when carried out correctly (Courty). The operation is as follows:—

The external genitals and vagina are first carefully disinfected, and then the cervix is exposed by one or two of Simon's specula. The anterior and posterior cervical lip are seized with volsella, and the uterus is washed out with 3 per cent carbolic lotion. The os uteri is then extended on each side by incisions $\frac{3}{4}$ -1 cm. ($\frac{1}{2}$ - $\frac{3}{4}$ inch) in width. Cowper's scissors are used. Two wound surfaces are thus formed which are next the cervical mucous membrane, and which extend from the apex of the anterior to the apex of the posterior lip. These wounds tend to gape. The wounds are now closed by interrupted sutures of silk or catgut passed transversely under the wound surfaces, and bringing cervical and vaginal mucous mem-

brane of the portio into apposition. In this way the os uteri retains its gaping condition, and reunion of the cut surfaces is impossible, whereas this often takes place after simple discision without suturing. The sutures are passed from above down, and tied at once.

The assistant on the right with his left hand must draw forward strongly the already tied sutures, together with the upper volsella, while with his right hand he turns in the wound edges by means of long forceps curved at the points. He must fold them in so that the operator may bring them into accurate apposition in spite of the dense tissue separating them. For this purpose the operator must tie the sutures very tight and fast. It is still better for easy coaption of the wound edges if we cut out the opposed wound surfaces in a keel shape (Chrobak). After suture the threads are cut short,

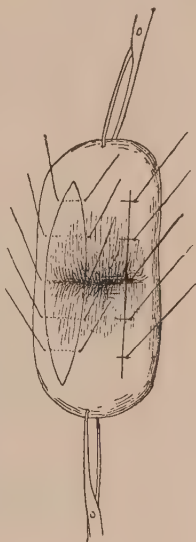


FIG. 59.

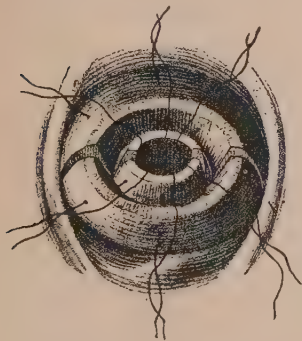


Fig. 60.

iodoform is dusted over the wound, and a strip of gauze left in the vagina. The patient should keep her bed eight days, the threads are better removed eight days later. When there is great discharge, daily vaginal douches of lysol should be given. If the lower surface of the portio is wide, and the whole portio somewhat cylindrical or mushroom shaped, the conical excision of Simon-Marek-

wald is advisable. For this the bilateral discision is made

first, and then a wedge-shaped piece is cut out of both lips of the cervix, the base of the wedge being downwards. Fig. 60 shows clearly the mode of incising and suturing.

In stenosis of the whole cervical canal and the internal os uteri discision is of no use. The parts of the incisions above the insertion of the vagina reunite.



Fig. 61.

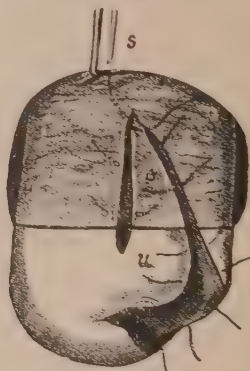


Fig. 62.

Here it has been customary to employ mechanical dilatation. The use of a constant current of 50 milliamperes' strength with the negative pole in the uterus is the least painful and the most speedy method of dilatation. A few sittings suffice to widen the whole cervical canal to all appearances permanently. Dysmenorrhœa disappears and conception may take place, as the author has many times noticed. When so strong an electric current is not at hand the cervical canal is dilated with metallic dilators just before menstruation without causing great pain, and the uterus is tamponaded with gauze. Menstruation is then usually painless. The procedure should be repeated once or more if necessary. Mechanical dilatation is much quicker under anæsthesia. Under anæsthesia solid metallic dilators, such as Hegar's, can be passed one after the other, and the uterus then completely tamponaded with gauze. Anæsthesia

enables the dilatation to be carried out more fully. The tamponade causes a marked relaxation of the whole cervix, and an active hyperæmia of the uterine tissues, which is of especial value in cases of defective development. A plastic dilatation of the cervical canal has been described by Vulliet and practised with success by him and by the author. This consists in opening the anterior vaginal vault, in splitting the anterior cervical wall (Fig. 61), and in suturing a flap taken from the portio (Fig. 62) into this splitting. At the upper part of the flap (Fig. 62), which is implanted on the supravaginal part of the cervix, the mucous membrane of the portio must be removed.

THE INFLAMMATORY DISEASES OF THE UTERUS.

Inflammation of the Uterine Parenchyma (Metritis).

1. Acute Metritis.

THIS arises in connection with gonorrhœal endometritis, and also through infection of wounds of the uterus. The latter are usually caused during parturition, but may be the result of operative manipulation. The simple passing of an unclean uterine sound, or the removal of a small polypus, can cause metritis which may end in fatal peritonitis. The question how far a chill or improper conditions during menstruation may be direct causes of acute metritis we leave unsettled. Anatomically we find in these cases hyperæmia and serous exudation and small-celled infiltration of the tissues. Staphylococci and streptococci are found in the lymph spaces and veins of the uterine wall in cases of septic infection. In favourable cases a wall of granulation tissue prevents their further spread (Gärtner, Bumm).

Symptoms.—Severe pains are felt in the hypogastrium, there is fever, and in gonorrhœa, markedly purulent discharge from the enlarged and tender uterus. Peritoneal symptoms—abdominal distension and vomiting—come on if the serous coat of the uterus is specially implicated. Abscesses in the uterine wall itself are very

rare. A few days' quiet rest in bed will usually cause the acute symptoms to remit.

The treatment consists of absolute rest in bed, free movement of the bowels with castor oil, use of ice-bags, and opium or morphia for unceasing pain. Ichthyol has a happy effect upon the pains, and it is also vaunted as having extraordinary powers as an absorptive. It is prescribed in pills, 0·4 gramme (6 grains) daily, and as a salve in equal parts with lanolin and vaselin. If the disease arises from infection of a wound, any stitches present must be removed, the wound should be washed with 3·5 per cent carbolic or 1 per cent lysol solution and dusted with iodoform powder; and the cavity of the uterus must be washed out with the same solution and filled with iodoform gauze. In gonorrhœal infection only anti-septic vaginal douches can be used during the acute stage. Stupes or fomentations are applied as soon as the acute inflammation subsides. In gonorrhœa the local treatment of the endometrium must also be attended to (see p. 109).

2. Chronic Metritis.

This is uncommonly rare as an isolated disease. With it are found as a rule endo- peri- and para-metritis, so that the symptomatic expression of chronic metritis is indeed difficult to define. The anatomical basis of chronic metritis is an increased growth of connective tissue from hyperæmia, and finally, cirrhotic contraction of the whole uterine wall. As regards the ætiology, all circumstances which produce hyperæmia of the uterus are of importance. Thus subinvolution after child-birth leaves the uterus abnormally rich in blood, and forms the most frequent cause of chronic metritis. An abnormally strong determination of blood to the uterus, without a sufficient consequent removal of it, takes place from imperfect or interrupted coitus, from masturbation, and from hindered excretion, in displacements of the uterus from cicatricial

bands about the uterus, after peri- or para-metritis, from tumours of adjoining structures, from habitual over-distension of the bladder and bowel, and from diseases of the liver, lungs, and heart, which also produce induration of the other pelvic organs. The uterine parenchyma is also secondarily affected by extension of the inflammation from the endometrium.

The symptoms of simple uncomplicated chronic metritis (which is very rare) consist only of sacral pain, a feeling of weight and tension in the pelvis, and when the enlargement of the uterus is great, frequent desire for micturition. Increased menstrual flow (menorrhagia) and increased uterine secretion point to affection of the endometrium which overshadows the chronic metritis. And on the removal of the former the symptoms of chronic metritis disappear.

The diagnosis of chronic metritis may be decided upon when the uterus is enlarged and tender. When the uterus is not fixed, the normal bend of the anterior surface is lost, that is, the uterus is in a position of anteversion. Pregnancy must be specially taken into question when considering the differential diagnosis. In this condition, however, the uterus is much softer and more yielding. If the diagnosis of chronic metritis has been made, it is necessary to note which of the almost always accompanying complications are present, since the symptoms of chronic metritis disappear with the successful treatment of the complications.

Treatment.—Suitable treatment during the puerperium, and especially in connection with abortion, is necessary as a prophylactic means. More care should be bestowed upon the training of girls at the time of puberty so as to ensure regular habits of defæcation and of micturition. Displacements of the uterus must be rectified. Cicatricial bands following peri- and para-metritis should be stretched by massage, which should also be applied to the uterus itself. Massage causes resolution of recent inflammatory exudations, and by exciting uterine con-

traction, removes the accompanying hyperæmia. Hot vaginal douches (up to 50° C.) (122° F.), dilatation of the uterus by tents or by tamponading with iodoform gauze, curetting followed by the use of a solution of chloride of zinc (to 50 per cent) as a caustic, all act in the

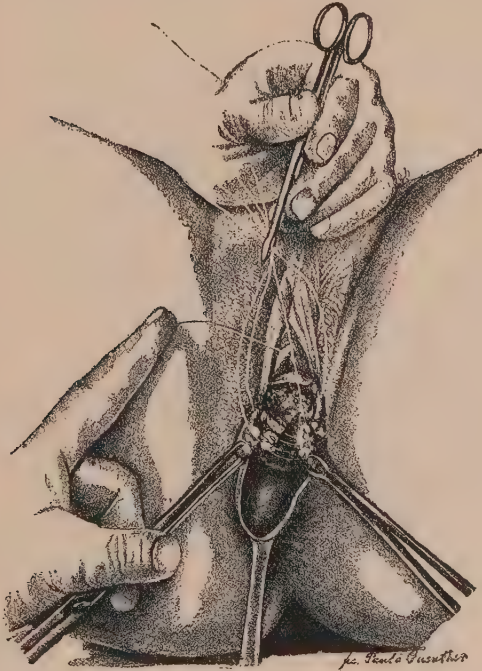


Fig. 63.

same manner. This last method of treatment essentially cures the endometritis from which the metritis primarily arose. It tends to shorten the period of local gynæcological treatment, and thus lessens the probability of subsequent neuroses. In quite chronic cases where the

uterus is very indurated and enlarged this treatment is not successful. Amputation of the portio is indicated in these cases, and this, according to C. Braun and A. Martin, leads to involution of the whole uterus. The excision of a wedge-shaped piece from the whole anterior cervical wall, after opening the anterior vaginal vault, is



Fig. 64.

technically more simple and practical. The author has performed this in a series of cases. If the cervical canal is very big, a piece of the mucous membrane is removed at the same time (Fig. 63), if it is normal in size the wedge is only carried up to the mucous membrane. The space is closed by 5-7 interrupted sutures, those passing through the supravaginal portion are buried. The wound in the

vaginal vault, which is naturally a transverse one, is closed with continuous catgut sutures transversely, and only after vaginal fixation (see operative treatment of retroflexion) is it closed sagittally (Fig. 64). By this operation a normal slender cervix is obtained, which later cicatricial contraction will not alter. Para- and perimetritis posterior, which have commonly followed the hitherto used method of amputation of the portio (p. 120) cannot occur. As "after-treatment" the various bath and water cures are used (brine, mud, chalybeate, and sea-baths, iron, and purgative waters). The benefits derived from these are due to the altered and (hygienically) more suitable methods of living which of necessity accompany their use.

Inflammation of the Endometrium (Endometritis)

This may be localised in the cervix alone—(endometritis cervicis); in the body alone—(endometritis corporis), or in both cervix and body.

Acute Endometritis.

Acute endometritis arises from the same causes as those given for acute metritis. As a secondary condition it is found in infectious diseases and phosphorus poisoning; the inflamed mucous membrane exhibits numerous hæmorrhages (Slavjansky). The diagnosis is based upon the intense redness and swelling of the visible cervical mucous membrane, upon the profuse purulent or foul secretion, and on the tenderness of the whole uterine lining on exploration with the sound. The danger of acute endometritis lies in the possibility of its causing peritonitis or infection of the blood in cases where there is no proper granulation wall formed to prevent the entrance of fission

germs into the lymphatics and veins. Chronic endometritis may be a sequel of the acute condition. The treatment consists of rest in bed, emptying of the bowels, and application of ice-bags. In cases of septic endometritis, antiseptic uterine douches are used as mentioned in acute metritis, and the uterus is tamponaded with iodoform gauze of 20 per cent strength. When the fever and the foul discharge still continue, and there is no disease of the appendages, curetting comes into consideration. In acute gonorrhœal endometritis this could only be permitted at the very commencement of the disease before it has reached the tubes and the peritoneum, when the uterus and appendages are not perceptibly tender on pressure. The gynæcologist very rarely sees such cases.

Chronic Endometritis.

This disease arises from the same causes as chronic metritis, and in addition from mischief, usually of an infectious character, which reaches the endometrium from the vagina.

Gonorrhœal and puerperal endometritis, and as B. S. Schultze has pointed, the endometritis of young girls, arise in this way. The humid tract of menstrual fluid at the time of menstruation offers an opportunity for infection from the atmosphere. In addition to this, direct irritants of the endometrium may produce inflammation. To this class belong the endometritis of myomata (Wyder), and the endometritis after abortion, which is caused by the retention of chorionic villi and decidual cells. Finally ovarian diseases can reflexly excite hyperæmia of the uterus, and lead to hyperplastic endometritis (Brennecke).

1. Endometritis Corporis Chronica.

Pathologico-anatomical Condition. — On microscopical examination only the signs of inflammation are

seen, especially redness and swelling. More marked swelling of circumscribed character produces polypoid outgrowths. The microscope alone can separate the various forms of inflammation. C. Ruge differentiates two forms, the glandular and the interstitial. In the first the glands are dilated and enlarged or increased in number. In the second, small-celled infiltration of the connective tissue is seen in earlier stages, and in later stages spindle cells. This may produce complete loss of the glands and the surface epithelium (endometritis atrophica). Mixed forms also arise. When the endometritis is due to abortion, decidual cells are found in the inflamed endometrium.

Symptoms of corporeal endometritis. These consist of quantitative and qualitative changes in the secretion, increased menstrual flow (menorrhagia), and pain. The normal mucous membrane of the body of the uterus has no secretion, whereas the diseased endometrium secretes a glassy mucus, or glassy mucus mixed with pus, or pure pus. And, moreover, at each menstruation fibrinous clots or the superficial layer of the inflamed endometrium may be cast out. The latter condition is called "endometritis exfoliativa," or from the symptoms "membranous dysmenorrhœa." The general health suffers from the loss of blood and the copious secretion, and very marked anæmia may ensue. We find both of these symptoms especially well marked in endometritis glandularis caused by myomata. In interstitial endometritis hæmorrhage is the only symptom. Very severe disorders of the general system often arise in those forms of endometritis where only a small amount of mucopurulent secretion is discharged. Dysmenorrhœa and sterility, nervous dyspepsia, pain in the sacrum, migraine, asthmatical attacks, and nervous coughing fits (B. S. Schultze) also come on in these cases. The pain arising from endometritis may be continuous or exist only during menstruation (dysmenorrhœa), or come on between the periods (intermenstrual pain). The intermenstrual pain is frequently produced, as B. S. Schultze

showed, by a periodical discharge of pus from the uterus lasting only a few hours or days. The various painful sensations which accompany endometritis can be excited by irritating the mucous membrane with a sound.

Diagnosis.—When the symptoms given above are present, and there is no sign of cervical catarrh (erosion or ectropion) corporeal endometritis may be diagnosed. As regards the amount of menstrual discharge, the physician judges by the patient's account, by observing the cervix by means of a speculum, or by wiping out the uterus with cotton wool on a Playfair's probe he can find if the secretion is abnormally copious or purulent. The probe usually passes with great ease into the dilated uterine cavity of corporeal endometritis. In cases where no manifest symptoms are present it is very useful to catch the scanty secretion by means of B. S. Schultze's tampon probe. A tampon is dipped into a 20-25 per cent solution of glycerine tannin and then placed for 24 to 48 hours against the external os. If the uterus is healthy nothing more than a little lump of glassy cervical mucus is found upon the tampon, if the uterus is diseased pus is found. When cervical catarrh exists continuous menorrhagia points to corporeal endometritis as a complication. If no menorrhagia exists then a diagnosis of corporeal endometritis may be made when the probe covered with cotton wool passes with ease into the uterine cavity, and can there be freely moved about in all directions. The diagnosis of endometritis from the symptoms is generally easy, but it is necessary to use the microscope in those cases where the menstrual discharges of two periods run into one another, or where metrorrhagia develops out of menorrhagia and there is any possibility of malignant disease of the endometrium. In such cases it naturally depends upon other circumstances whether the operator simply removes a small bit of the membrane with the curette for microscopic examination, and treats the case accordingly, or whether he

performs complete curetting at once and examines the removed masses afterwards with the microscope.¹

If the investigation shows a simple endometritis, then a few applications of caustic will very frequently suffice, but in malignant disease total extirpation should follow curetting.

The **prognosis** of endometritis is favourable if the disease can only be placed under treatment before complications arise. These are metritis, peri-metritis, parametritis, and malignant degeneration. When left to itself hæmorrhagic endometritis, especially when resulting from myoma, may cause death as a consequence of anæmia and cardiac degeneration.

Treatment.—Removal of the diseased mucous membrane is undoubtedly the quickest and safest means of completely curing or palliating the disease. In the latter case the disease is subsequently cured by means of caustic applications. After curetting, a new and in many cases completely normal mucous membrane is formed from the fundi of the glands and the connective tissue around the glands. These, owing to their lying in depressions of the muscle fibres, are not touched by the curette. The result of caustic applications without previous curetting is very uncertain, and the treatment lasts much longer. Curetting is contraindicated only when there is pus in the neighbourhood of the uterus, especially in pyosalpinx (the bursting of which, with consequent fatal peritonitis, might be

¹ The technique of microscopical examination does not differ from that in general use. The author believes in the method of Von Benda. The specimen is placed in a 10 per cent solution of saltpetre for some hours, then in Müller's fluid. It is cut with the freezing microtome and sections are stained with Böhmer's hæmatoxylin solution. Within 24 to 48 hours one can obtain very good slides. Or one can harden with alcohol and cut the specimen with a razor, holding it fixed in a piece of liver. It is absolutely necessary to go by the views of C. Ruge in order to get the true explanation of the specimen. These are very clearly given in Schröder's *Handbuch d. Krankheiten d. w. Geschlechtsorgane*. If the material removed after every curetting be examined, the examiner will soon obtain the necessary skill to enable him to distinguish between benign and malignant disease of the mucous membranes with certainty.

caused by operation), and when peri- and para-uterine exudations or their sequelæ exist. On the other hand, chronic peri- and para-uterine bands do not contraindicate either curetting or the application of caustics. In fact one often sees that after local treatment of the endometrium the previous tenderness of these bands and other troubles disappear. The latter, such as pain on walking, on defæcation and coitus, are dependent upon the irritation of the tender bands. From what has been said it will be seen that curetting should only be undertaken by some one who is accustomed to diagnose gynæcological conditions.

After curetting, any cause of hyperæmia which tends to endometritis must be removed. Displacement of the uterus should be rectified, peri- and para-metric bands must be stretched by massage, the determination of blood to the uterus must be treated by provoking uterine contraction (by massage, hot douches, caustics, etc.), and the general disorders of the circulation must be attacked at their source (liver, heart, lungs). Advice must be given as to the importance of regular habits of the body (bowels and bladder), and the necessity for wearing an absorptive (sublimated wood-wool, moss-pad) diaper during menstruation must be insisted upon. Curetting, followed by the injection of tincture of iodine, often cures endometritis, even when the cause of irritation still continues. Runge has proved this in the endometritis of myomata, and the author can endorse his view. The author finds chloride of zinc (50 per cent solution) still more effective than tincture of iodine in these cases.

Description of Curetting.—By curetting (Synonyms, Abrasio, Raclage, Scraping) we understand the removal of the uterine mucous membrane by means of special instruments, such as a sharp spoon, or what is more advisable, a metal loop whose upper rim is sharpened, and 4-10 mm. broad (the curette). This was first brought out by Récamier in 1846, then condemned and finally cast into oblivion, was introduced into Germany by Hegar, Kaltenbach, and Olshausen, and soon obtained

general recognition. The operation of curetting, by its curative effect upon the commonest of gynæcological diseases, endometritis, is decidedly one of the most beneficial achievements of modern gynæcology. Curetting is an achievement of modern gynæcology, since antisepsis alone could make the operation a manipulation devoid of danger.

The chief use of the curette is for the removal of diseased mucous membrane of the uterus in the various forms of endometritis, which manifest themselves partly by hæmorrhages and partly by discharges. If the endometritis affects only the cervical mucous membrane, curetting of the cervix is indicated, but the mucous membrane of the cervix can only be removed very incompletely. The curette, however, always acts well by destroying the mucous follicles and breaking down numerous blood-vessels. On the other hand, the mucous membrane of the body of the uterus can be removed entirely except the remains in the gland depressions of the muscular coat. The patient may be placed on a gynæcological examining chair, or on a four-cornered table, or across a bed. In the two latter positions Schauta's crutch is very useful, but not absolutely indispensable. An assistant standing on the right of the table, or sitting on the right side of the patient in bed, can comfortably hold the flexed limbs against the patient's abdomen with his left hand and still have his right hand free for holding the irrigator. If the patient is not anæsthetised she can, if laid across the bed, place her feet on two stools between which the operator sits. It is well worth the trouble to anæsthetise the patient if she is delicate or nervous. The bladder and rectum must be emptied before the operation. After sufficient disinfection of himself, the operator disinfects the external pudenda and parts around by washing and rubbing with 1 per cent lysol solution and by soaping well and then douching with 3 per cent carbolic lotion. The vagina is washed out with the same solution, and the walls are well rubbed

down with a *couple* of fingers. The anterior lip of the cervix is seized with volsella. This is done under guidance of one or two fingers, or by means of Simon's or Nott's speculum (the posterior blade of Simon's speculum suffices to expose the cervix if the anterior vaginal wall be held up with the left forefinger). The volsella are handed to the assistant, and a double channeled catheter is passed into the uterine cavity under the guidance of the finger which was kept *in situ*. The uterus is then washed out with one of the already described solutions. The curette is carried into the uterus in a similar manner. It is well for the beginner, after letting the volsella go, to push the uterus forwards and upwards with the curette, and to feel from without with the left hand whether the curette lies fully in the fundus uteri.

If this is the case, the volsella are taken again with the left hand and the anterior and posterior uterine walls are methodically scraped with the curette. The curette is then turned and the fundus and lateral angles are likewise scraped. For this one must naturally press the curette with some degree of force against the uterine wall. One can scrape downwards with some force, but must carry the curette back very gently. Usually there is no evil result from a perforation with an aseptic instrument unless liquor ferri or some similar solution be injected afterwards. If the uterine cavity is very large the curette must be bent to reach every part of the mucous membrane. For this reason it is necessary to remove the speculum to secure complete curetting of the anterior wall, because the speculum often prevents the required depression of the handle of the curette. After the curetting, the uterus must be again washed out so as to ensure the removal of the bits of mucous membrane. If cervical catarrh is also present the cervix must be curetted as well.¹ A caustic

¹ When the curetting is performed for diagnostic purposes the cervix must be scraped in every case. If this be neglected carcinoma of the cervical mucous membrane may be missed entirely.

injection of tinct. iodi, liq. ferri, or zinc chloride in 50 per cent solution, is usually made after the curetting by means of Braun's syringe. In order to prevent the passage of the agent into the dilated tubes and the peritoneal cavity, the piston must be pushed in very gradually while at the same time the syringe is slowly withdrawn from the uterus. Then the uterine catheter must be quickly introduced to wash away any superfluity of the agent, which if left causes very severe uterine colic. If the catheter be not introduced at once the internal os contracts and renders its passage impossible. The author has entirely ceased the use of these injections, and now applies caustics by Playfair's probe only. The bleeding is usually slight, but may be very profuse, especially in endometritis after abortion. In these cases tamponade of the uterus and vagina is indicated. A strip of iodoform gauze 1-4 cm. (0.4-1.6 inches) broad is introduced up to the fundus of the uterus when the cervical canal is sufficiently dilated. This is done with long forceps, or a uterine sound, or Asch's instruments (p. 20). The whole uterus, and the vaginal vaults are plugged tightly. The vagina is plugged with wool tampons. The tamponade must be a very firm one, since the stoppage of bleeding in the non-puerperal uterus is produced much more by compression than by inducing uterine contractions. The materials for plugging are contained in the cases mentioned by the writer on p. 23. A sudden marked dilatation of the uterine cavity is an event which often happens in curetting, and it simulates perforation of the uterus. The curette all at once seems to pass in deeply without finding any resistance. But on external palpation the curette is found to lie not immediately under the parietes but to be surrounded on every side by a very thin and slack sac-wall. A fitting explanation of this fact has not been given. If perforation is caused, which may happen in spite of all care in a puerperal uterus, the curetting must not be continued, and no caustics must be applied. With previous asepsis all inflammatory danger is avoided. The

pains which often come on after curetting are treated by water packs, and if necessary by injection of morphia. After being curetted a patient must rest absolutely for at least four days in bed. When any discharge remains, a second application of caustic (zinc chloride 50 per cent solution) should be made fourteen days after the curetting. If the method of injection be used, it can only be carried out with the patient at home in bed, for very strong uterine colic often follows it, a proof that this reagent causes strong uterine contractions. Additional applications of zinc chloride (6-12 at two to eight day intervals) are only used when curetting has been a failure, or in exfoliative endometritis and the endometritis of myomata. They are also used in those cases where the discharge still persists after fourteen days from the last application. The applications of caustics after curetting must be made with Playfair's probe alone in patients who are walking about. The uterus must be washed out with antiseptic solutions both before and after use of caustics. Should the patient decline curetting the physician is confined simply to these applications repeated every eighth day. Chloride of zinc in a watery 50 per cent solution, as introduced by Rheinstadter and Bröse, has pleased the author very much as a caustic application. If menstruation ceases during a long-continued course of caustic applications while discharge still continues, this points to the onset of cicatricial degeneration of the mucous membrane of the uterus, the discharge coming from the cervix. The cervix should be curetted without putting the patient to bed, and the applications of caustic should be limited to the cervix. If this method of treatment be carried out there is very little necessity, except in rare cases, for any other therapeutic aid. In the same class of cases electrolysis can be used by Apostoli's method. When this also fails, total extirpation of the uterus and myomectomy (in the case of myoma) may be taken into consideration.

Endometritis cervicis.

This is divided into the acute form (which is rare) and the chronic form of cervical endometritis (or cervical catarrh). — The acute form is seen after severe gonorrhœa or septic infection. The latter is generally seen after labour, where cervical lacerations form entrance ports for the invasion of streptococci, but one may see it after gynæcological operations which have not been performed with strict antisepsis.

The acute gonorrhœal form can be told by the swelling of the portio and its vivid redness, by the free oozing of pus from the os uteri, and by the protrusion of the cervical mucous membrane itself, swollen and blood red, from the os uteri. Taken with the urethritis and acute colpitis always present in these cases, there is a complex condition which, without examining the cervical secretion for gonococci, makes the diagnosis of gonorrhœa certain.

In septic infection of cervical lesions, the inflammation of the cervical mucous membrane is put in the background by the septic ulceration arising from the injuries. This is accompanied by a foul discharge and fever.

The diagnosis is therefore easy.

As regards prognosis, the danger of gonorrhœal inflammation lies in its spread to the mucous membrane of the body of the uterus and of the tubes, and to the pelvic peritoneum and ovaries. This inflammation, which leads generally to encapsuled abscesses in the tubes, ovaries, and peritoneum, may in rare cases extend to general gonorrhœal peritonitis (Wertheim), and cause death. At the least, however, serious invalidism is the result of propagation of the inflammation of the cervical mucous membrane to the pelvic peritoneum.

In the septic form the prognosis depends upon whether the inflammation remains local or spreads by the lymphatics and blood-vessels.

The treatment consists, in the gonorrhœal form, in antiseptic douches of lysol, 1 per cent, and tamponading

the vagina afterwards with iodoform gauze—this should be done daily. A 1 per cent solution of chloride of zinc (Fritsch) is also very useful as a douche. Together with care for removal of the secretions absolute rest in bed and regular action of the bowels are necessary; and on symptoms of inflammation of the uterus or pelvic peritoneum an ice-bag may be applied. The septic form is treated locally by syringing the ulcers with 1 per cent lysol solution and dusting them with iodoform. In severe general infection no result can be expected from this treatment, and it should be omitted in order to spare the patient unnecessary worry.

Chronic cervical catarrh arises either from the acute form or may come on without any acute stage. But even in the latter case it is caused by the same noxious agents as in the acute form. Gonorrhœal infection plays by far the leading part. Slight septic infections during labour are also factors. Even in virgins, as B. S. Schultze has shown, the moist continuous channel of menstrual blood flowing away may give the opportunity for infection, especially if, through want of cleanliness, the blood becomes decomposed on the external genitals. Bacterial invasions are very much facilitated if the vagina and cervix gape widely through chronic lacerations.

Pathological Anatomy.—The inflamed membrane is swollen, very injected, and secretes mucus or pus very freely. The cylindrical epithelium grows apace and sends glandular prolongations into the deeper structures. The squamous epithelium upon the outer surface of the portio changes from its deepest layers outwards into cylindrical epithelium (C. Ruge and J. Veit).

Simple erosion arises in this manner. This is not a loss of substance, as was formerly thought, but a change of structure in tissues. Still the cylindrical epithelium of the erosion can be secondarily removed, as proved by Döderlein and the author in their investigations. By this means a true loss of tissue, a true erosion in the old sense of the word, arises. If the glandular ingrowths pass

in regularly and perpendicularly to the surface, there are left shut off between them thin bits of mucous membrane which look like papillæ under the microscope—papillary erosion. If the glands become shut off they form cavities filled with secretion—follicular erosion. These increase in size and project above the level of the mucous membrane. Through their weight they may drag the adjacent mucous membrane into the form of a pedicle. In this way polypi of the mucous membrane are formed. When a great number of follicles lying together increase, and the cervical connective tissue also participates in the growth, Virchow's follicular hypertrophy of the cervix results. The growth can be so extensive as to reach the vulva (Fig. 65). If these cystic growths with the increase of connective tissue do not become prominent in this way they may form tumour-like projections in the cervical cavity which are apt to be mistaken for cancerous degeneration. In nulliparæ with narrow os uteri the cervix may be ballooned from the retention of secretion.



FIG. 65.—After Beigel.

Symptoms.—These consist of the free discharge of tough secretion often mixed with pus, and of hæmorrhage which occurs at other times than the periods, and of pain which, in follicular erosion, is frequently of an unbearable burning character.

Diagnosis.—The examining finger is at once struck with the softness or nodular consistence of the cervix. A mass of viscid cervical secretion often sticks to the finger. The erosion is seen in the speculum, that is, the os uteri is surrounded by a vividly reddened circle, which is sharply

contrasted with the paler tint of the normal portial mucous membrane. In papillary erosion a sensation as of a finely granular surface is perceived, and on wiping off the secretion there is generally some bleeding. In follicular erosion the follicles project as gray or yellow nodules (ovuli Nabothi). The inflamed cervical mucous membrane is exposed to view in cases of old laceration (ectropium). The condition in multiparæ which is often designated as erosion is really ectropium, caused by exposure of the cervical mucous membrane in an ununited laceration. Roser, Emmet, and Döderlein affirm this, and the author, from his own investigation, agrees with them. The author would only count as pure erosion those rare cases in multiparæ with narrow os uteri, where the erosion spreads out widely on the outer surface of the portio. If the os uteri in multiparæ is surrounded with only a narrow vividly reddened zone, this may be simply ectropium and not erosion, *i.e.* it is swollen inflamed mucous membrane of the cervix pressing out of the os uteri. For it is only with a very small os that nothing of the inflamed mucous membrane can be seen. Then dilatation of the cervical canal and consequent shortening of the entire cervix may be present, as already mentioned. Polypi and follicular hypertrophy are recognised at once in the speculum. Carcinoma of the portio appears at first as an easily bleeding erosion. Gusserow points out that with sufficient care it is possible to distinguish between these affections by noting that the commencing cancer has a deeper ulceration and produces loss of tissue, and often has raised and infiltrated edges. Certainly it can only be secured by removing a portion which includes the cervical tissue proper, and examining this microscopically.

Prognosis.—The general health suffers from the abnormal loss of natural fluids and from pain. Sterility may be caused in multiparæ by cervical catarrh. This may deleteriously affect the mind. The possibility of malignant degeneration must always be remembered.

Treatment.—The most important part of the treat-

ment consists of the therapeutic management of the diseased cervical and uterine mucous membrane itself. The treatment of simple erosion is of quite secondary importance. Cervical catarrh is treated by cleaning out the cervical mucus with Playfair's probe, and then scraping the surface with a curette or a sharp spoon. Even if the mucous membrane be not completely removed by this means, still a great number of vessels are opened and the hyperæmia is reduced. The same end is effected in erosion by scarifying with a lancet. The cervical canal is then wiped out with cotton wool wrapped round a probe, and dipped in 3 per cent carbolic lotion. An iodoform glycerine tampon is placed against the cervix, and is removed by the patient in twenty-four hours. Eight days later caustications of the mucous membrane and erosions are begun after previous wiping away of the mucus. These are repeated every four to eight days. After using the caustic, the vagina is washed out with 1 per cent solution of lysol, and a glycerine iodoform tampon is placed at the cervix. As caustics, pure acetic and nitric acids are good, also Liquor Bellostii (Sol. Hydrargyri nitrici oxydulati), and of late years the 10-50 per cent solution of zinc chloride is commended.

In cases of cervical catarrh, with extensive follicular distension, this treatment is not sufficient to remove the inflammation. *Schröder's operation* (*excisio mucosæ cervicis*) for excising the diseased cervical mucous membrane, is here indicated. For this purpose the lips of the cervix are seized with volsella, drawn downwards, and cut with Cowper's scissors, at the boundary line of the erosion. The erosion on the anterior lip is snipped round (Fig. 66, *a*) with scissors, and the cut is then carried obliquely upwards and inwards into the substance of the cervix. A second incision is carried into



this one, cutting the cervical mucous membrane transversely. Schröder lays stress upon carrying this incision as high up as possible. This makes it difficult to close the whole wound surface exactly with sutures, and a pocket is easily left; and even with this the whole mucous membrane is not removed. The wound, in which

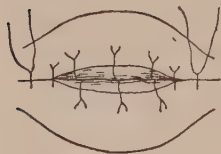


FIG. 67.

often several arteries may spurt, is at once sutured (Fig. 67), the needle being carried through the middle of the anterior edge of the wound, and under the whole wound surface out through the cervical mucous membrane. If the bleeding is severe the sutures are tied as soon as passed, the right assistant drawing the outer and inner margins of the wound together with long hooked forceps. In the same way one or two lateral sutures are passed, so as to coapt the portial with the cervical mucous membrane.

With the sutures which have been left long, the assistant on the left draws the cervix downwards. The operator, seizing with his left hand the volsella which hold the posterior lip, snips round the erosion on the posterior lip, as described for the anterior lip, and then makes the transverse cut from inside. The suturing of the posterior lip is performed from before back, the assistant drawing the outer flap upwards. After suturing the posterior lip, the long uncut suture ends are drawn to the right by the assistant, and the operator closes the left lateral incision by means of one or two sutures passed from above down. The assistant on the right must turn the wound edges in with forceps at the moment of suturing. The lateral incision of the right side is sutured by reversing the process. The sutures, with the exception of the two extreme lateral ones, are cut short, the cervix is dusted with iodoform, and a strip of iodoform gauze is placed in the vagina. The two lateral sutures are left long, so that the cervix may be drawn into view if bleeding

takes place. When the cervical canal is dilated, the inner and outer mucous membranes may be joined here in the same way as on the lips. The lateral stitches are then not used. This is Hegar's method of circular suture. Since the wound on the posterior lip, owing to retraction, often lies near to Douglas's pouch, the stitches may catch the peritoneum or come very near it. Hence the author has advised a few deep catgut sutures to close the deep part of the wound, and superficial ones to unite the mucous membranes. By this means posterior peri- or para-metritis is avoided. This occurs in at least 10 per cent of cases of removal of the posterior lip. Thus, if the suture holes become infected from cervical or vaginal secretions, the inflammation remains superficial and does not reach the peritoneum. By making the outer incision on the lower surface and not the posterior surface of the lip, the above described retraction is avoided. If the incisions in the cervix are carried higher, we get the so-called *keel-shaped amputation of the cervix* (Fig. 66, *c, d, e*). If the inner cut be placed nearer the apex of the lip, and carried obliquely upwards and outwards, we get the *conical excision* (Fig. 66, the dotted line near *b*). The first is specially recommended by A. Martin as very suitable for inducing involution of the whole uterus in chronic metritis; the latter by Simon and Küstner, for stenosis of the os uteri. Silk, silkworm, or silver-wire are good sutures for this operation. Catgut is much used of late. The patient must keep her bed at least eight days. The sutures are removed later.

Cervical Lacerations.

When cervical catarrh co-exists with deep cervical lacerations, the cure of the catarrh is not sufficient to relieve the condition. From the angle of the tear fibrous bands spread into the cellular tissue and still cause pain. *Operative closure of the tear* is indicated in

these cases. The cervix is drawn down with two volsellas, the lips are drawn apart, and the laceration denuded. The denudation must be $\frac{1}{2}$ -1 cm. (0.2-0.4 inch) broad, and partly encroach on the cervical mucous membrane. Below, at the seat of the new formed external os, the denudation must be narrower. The removal of tissue is often troublesome at the angles of the lacerations. The upper half of the denudation is united to the lower half by four sutures. The first suture lies at the angle of the laceration, and passes under the whole wound surface. This is not tied, but in case the laceration is left-sided, it is pulled upon by the assistant on the left towards his side. The next three sutures are passed above through the portial mucous membrane, and carried under the wound and out through the margin of the cervical mucous

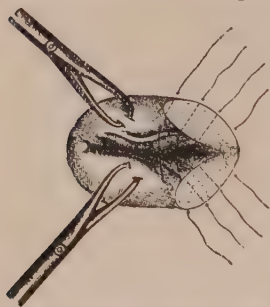


FIG. 68.—Emmet's operation (after Hofmeier).

membrane, then they are passed in a reverse direction in the lower half of the denudation. The sutures are not tied until all have been passed (Fig. 68). In double-sided laceration both sides are denuded. The denudation surfaces are not in this case cut under such acute angles, but the lower surface forms a simple continuation of the upper. The denudation is therefore easier, but the suturing

is somewhat more difficult in double lacerations. The suturing can be made easier by drawing the volsella, fixed in the cervix, to the right in left-sided tears, and *vice versa*.

For accuracy, it is better to freshen both sides, and put in the sutures of both sides before any of these are tied. Severe bleeding may hinder this. Then the sutures at the angles of the tears should be tied at once. Latterly the author has frequently used the method of suturing given in Fig. 69. This has the advantage of preventing infection of the suture holes from the cervical

canal by avoiding the cervical mucous membrane altogether. The after-treatment is the same as in removal of cervical mucous membrane.

If severe follicular cervical endometritis coexist with cervical lacerations, and excision of the cervical mucous membrane is indicated, this may be combined with Emmet's operation. The angle of the laceration is incised slightly with the scissors, and the circumferential and transverse cuts are run into the laceration angle. A cervical laceration may be closed without denudation by cutting into the laceration at the line of junction of the cervical and portial mucous membrane to the depth of $\frac{1}{2}$ cm. (for the length and the course of incision, see Fig. 69, line *cd*). By the separation or drawing apart of the edges of the wound a surface is formed whose upper half is united to the lower, as in Emmet's operation, and by his method of suturing. Yet simpler is the method of suturing with a single suture running the whole length of the wound, which I have used with success. The suture is carried under the whole length of the upper half of the wound, then emerges at the angle of the laceration, and is at once sunk again and carried under the lower half of the wound (Fig. 69). The passing of the suture is made easier by drawing the points *c* and *d* as high and as low, respectively, as possible with volsella. This "flap splitting" has an additional advantage over Emmet's operation, in that the fibrous bands running from the angle of the tear into the parametrium are easily and safely divided. The cervical flaps must not be made too thin. The incision must also run in the middle between the portial and cervical mucous membrane (Fig. 70, *i*, *h*, *e*, *f*).

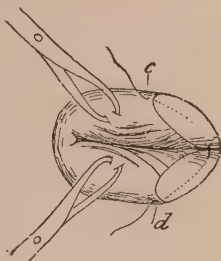


FIG. 69.

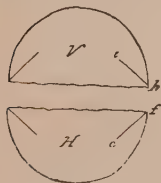


FIG. 70.

Ulcerations of the Cervix.

Superficial ulcerations, which are true erosions of the cervix, arise in senile colpitis quite independently of the cervical mucous membrane. They form a secondary condition. Similar erosions are described in syphilis as lentil-shaped destructions of epithelium, which are at times arranged together in rings and have a copper-red tint. Soft chancre of the cervix causes a loss of tissue, its cavity is deep with undermined corroded edges, which are surrounded by a zone of reactionary inflammation. Its base is eaten out. Hard chancre of syphilis, on the other hand, is indurated with a livid margin, it has a diphtheritic surface, and, as opposed to soft chancre, is isolated and single. The adjacent lymph glands are indolently enlarged, and can be felt per rectum.

Syphilitic ulcers (ulcerating syphilides) of the cervix have mostly a smooth spotted surface and a light opal colour. When we remember the existence of tubercular and cancerous ulceration of the cervix, it is evident that difficulties in differential diagnosis often arise which can only be settled by considering the patient's general condition and by microscopical examination. The treatment in tubercular and syphilitic ulcerations is directed against the disease itself.

DISPLACEMENTS OF THE UTERUS.

The Normal Position of the Uterus.

THE position of the uterus is a changing one, which is due, on the one hand, to the mobility of the uterus, and, on the other hand, to the varying condition of distension of the bladder and rectum.

1. When the bladder and rectum are empty the uterus

lies normally in a position of *anteversio flexio*—that is, the fundus is directed forwards and upwards towards the superior border of the symphysis pubis, the cervix is pointed backwards and downwards (anteversion), the uterus is slightly bent on its anterior surface (anteflexion), the fundus does not quite reach up to the level of the pelvic brim, and the tip of the cervix lies in the spinal line. This is the line joining the spina ischii (compare Figs. 5 and 6). When the woman stands

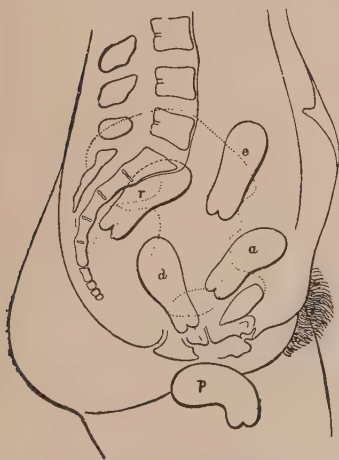


FIG. 71.—Schema of the displacements of the Uterus, after B. S. Schultze.

e=*elevatio uteri*, *d*=*descensus et retroversio*,
p=*prolapsus cum retroflexione*, *r*=*retro-*
positio, *a*=*antepositio*.

upright the posterior surface of the uterus looks somewhat upwards (B. S. Schultze).

2. With a full bladder the uterus lies normally somewhat retroplaced and retroverted—that is, the uterus is almost erect, the cervix pointing downwards and the fundus upwards.

3. With a very distended rectum the anteфлекed uterus is pushed forwards (anteplaced) and dislocated upwards (elevated).¹

The opposite condition of retroposition may be caused

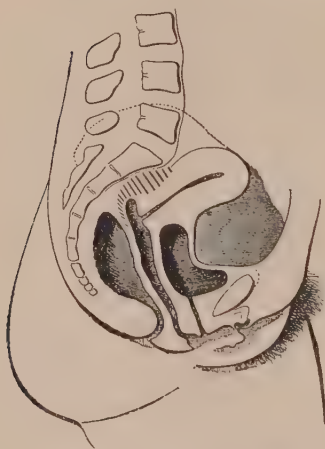


FIG. 72.—After B. S. Schultze.

by peri-metritic adhesion of the lower segment of the posterior uterine wall with the rectum (Fig. 72), or from shortening of the posterior parts of both broad ligaments. These displacements are of very little intrinsic importance. From what has been said it follows that the conditions found on examination with an empty bladder are of most value. For if one find a retroversion of the uterus with the bladder empty, it is evident that this is a pathological con-

dition; but if one find a retroversion of the uterus with a full bladder, there is a doubt as to whether the condition is a permanent one or merely temporary, and caused by the over-distension of the bladder. A constant and unalterable position of the uterus does not normally exist. Its attachments permit a certain mobility in all directions, and in addition the body of the uterus is

¹ This dislocation is also caused by the growth of tumours in the pouch of Douglas.

movable upon the cervix, so that not only a distended bladder, but even the examining finger, may displace the uterus (Fig. 71).

Anteflexion of the Uterus.

Pathologically, anteflexion can only be said to exist when the fundus of the uterus is directed forwards more constantly than normal, and there is at the same time permanent bending of the anterior surface (B. S. Schultze). This condition arises, according to G. Martin and B. S. Schultze, from posterior parametritis, *i.e.* an inflammatory infiltration with fibrous contraction of the connective tissue of the folds of Douglas, or from perimetritic adhesions between the posterior wall of the cervix and the rectum.

As the cervix is fixed behind and drawn upwards by these para- and perimetritic bands, the fundus is driven downwards by the abdominal pressure, and consequently the uterus is strongly anteflexed. Since the uterus lies far back, distension of the bladder cannot straighten out the flexion (Fig. 73). In infantile uterus, as caused by failure of development, marked anteflexion takes place. The cervix is abnormally elongated and lies in the vaginal axis, whilst the body of the uterus is abnormally small. This form of anteflexion becomes pathological, according to B. S. Schultze, only when there are other complications, such as stenosis, or metritis, or cervical catarrh.



FIG. 73.—After B. S. Schultze.

Other authors, however, consider it to be intrinsically pathological. As a consequence of disorders of the circulation which result from the abnormal fixation of the uterus in one and the same position, or as a result of endometritis, we get secondary chronic metritis. This destroys the mobility of the body of the uterus, and thus the uterus becomes permanently flexed.

Symptoms.—These are frequent micturition, dysmenorrhœa, sterility, and pain on defæcation. The bladder cannot raise the fixed uterus at all or only very incompletely. Owing to this, complete distension of the bladder (which can only take place when the bladder becomes globular) is prevented, and hence desire to micturate comes on sooner. This mechanical explanation of the dysmenorrhœa and sterility has prevailed since the time of Marion Sims. Abnormally marked flexion prevents the outflow of blood and the entrance of the spermatozoa, and incites the uterus to painful contractions upon the retained blood. Of late these troubles are referred more to the presence of complications, such as para- and peri-metritis, chronic metritis, stenosis and cervical catarrh (B. S. Schultze). Painful defæcation is produced by the irritation of the para- and peri-metritic adhesion-bands between the uterus and rectum.

Diagnosis.—This is formed from finding anteflexion, and proving it to be a fixed condition. These conditions of anteflexion and fixation are proved by bi-manual examination. First we perceive the anteflexion, and its permanence is proved by finding posterior adhesion per rectum, or by our being unable to straighten the uterus bi-manually, or by finding that even when the bladder is distended, the uterus still remains anteflexed.

Treatment.—This should in the first place be directed against the primary lesion, such as cervical or corporeal endometritis (see pp. 108 and 114).

Then the bands of the fixation must be stretched posteriorly. This is done either by daily bi-manual drawing forwards of the uterus, or more comfortably

and much sooner by Chrobak's method of elastic extension. The author carries this out in the following simple manner: the posterior lip of the cervix is seized with volsella, through the handles of which an elastic rubber tube is passed. The ends of this tube are pulled through a loop fixed at the foot of the bed as tight as the patient can bear, and are held by the loop. The tension established in this way is retained by fixing the ends of the tube in a clamp placed immediately beyond the loop. By 2 to 10 of such extensions, lasting 2 to 10 hours each, the author has obtained such stretching of para- and peri-metritic bands, that the most distressing symptoms have entirely disappeared.

This method of treatment can be carried out easily by any practitioner—it can be performed in the consulting-room on the examination couch. It is much less painful than the application of caustics.

If there is also stenosis this is treated after the manner described on p. 96.

Anteversion of the Uterus.

Pathological anteversion is that position of the uterus in which it is permanently straighter than normal, and lies with the fundus directed forwards. This permanence of position is either due to the broader surface which a uterus straightened and thickened by metritis offers to the intra-abdominal pressure (Fig. 74), or it may arise when the cervix is fixed behind or the fundus in front by chronic metritis. On the other hand, if the



FIG. 74.—After B. S. Schultze.

fundus is fixed behind, or the cervix in front, or if the sacro-uterine ligaments are abnormally lax, retroversion may arise out of an anteversion.

The symptoms are those of chronic metritis, namely bearing down, sacral pain, frequent micturition and dribbling of urine. If peri-metritic adhesions are also present in the pouch of Douglas, the patient complains of pain on walking, on defæcation, and on coitus.

The diagnosis is made from the evidence of the uterus being straight and lying with its fundus forwards (compare antelexio). The treatment is directed against the metritis and any other complications.

Retroversion of the Uterus.

Pathological retroversion of the uterus is that condition in which the fundus lies permanently backwards with a straightened or even slightly antelexed condition of the uterus itself.

Ætiology.—1. (a) Congenital or acquired shortness of



FIG. 75.—After B. S. Schultze.

the anterior vaginal wall (Fig. 75). In the latter case, it is due to senile involution. (b) Fibrous bands in the course of the ovarian artery which draw the fundus backwards (para-metritis superior of Ziegenspeck), or bands in the connective tissue between the cervix and bladder (para-metritis anterior) which pull the cervix forwards. These fibrous bands commonly arise from lacerations of the

cervix. When metritis is not also present, retroflexion

rapidly follows upon the retroversion (Figs. 76 and 77). 2. Perimetritic adhesions between the fundus and the rectum which draw the former backwards. 3. Extensive shrinking of the folds of Douglas with a uterus which has lost its normal curvature through metritis (Fig. 78). 4. Abnormal laxity of the sacro-uterine ligaments with chronic metritis. In this case distension of the bladder produces the usual retroversion of the uterus which was anteverted before. But the lax ligaments cannot perform their normal function, which is to draw the cervix back again, and thus they fail to re-establish the anteversion. The metritis, by rendering the uterus inflexible, prevents the retroversion becoming a retroflexion. The symptoms of



FIG. 76.—After B. S. Schultze.



FIG. 77.—After B. S. Schultze.

retroversion are those of retroflexion (see p. 133), and the treatment is the same.

The diagnosis is only certainly proved when the cervix is found in the long axis of the vagina, and the body of

the uterus is in the long axis of the cervix. By bi-manual

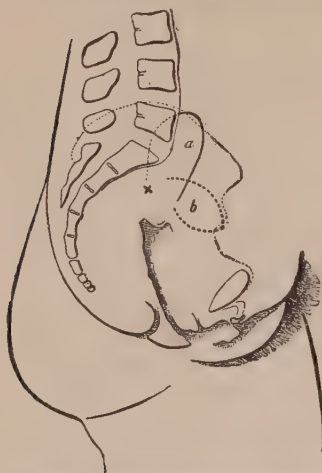


FIG. 78.—Chronic metritis diminished by absorptive treatment and the uterus consequently anteverted at its fundus (*b*).—B. S. Schultze.

examination the body of the uterus is not to be felt from the anterior fornix, but can be easily felt from the posterior fornix, and thus it is clear that the body of the uterus forms a straight continuation of the cervix backwards and upwards. If the posterior fornix is short, or if there are tender swellings in the pouch of Douglas, the examination should be made per rectum. If there is still uncertainty, the sound may be used.

A small anteverted uterus resting upon a lax hypertrophied cervix can be confounded with retroversion of the uterus since the anteverted uterus may lie in a position of retroversion.

Retroflexion of the Uterus.

In retroflexion the uterus lies permanently in a position of retroversion, and is also bent on its posterior surface.¹ On account of the approximation of the cervix to the symphysis pubis, the anterior vaginal wall lies in folds and partly prolapses. Retroflexion arises most frequently during the lying in, and especially after a badly treated abortion. The predisposing causes, excluding para-metritic processes,

¹ The uterus can be curved only on its anterior or posterior surfaces. The so-called dextro- or sinistro-flexions are really torsions of an anteverted or retroverted uterus which depend upon traction on one side only from previously existing fibrous bands.

are the laxity of the uterus itself and its ligaments, more especially the sacro-uterine ligaments (Fig. 79). The continuous dorsal position and over-distension of the bladder induce retroversion. The uterus remains in this position for good, if the sacro-uterine ligaments are so lax that they cannot draw the cervix backwards again, and this is encouraged if the involution of the parts is incomplete owing to faulty treatment. The latter includes too early getting up and the undertaking of hard work.

The increased abdominal pressure acting on the loose junction of the cervix and the body of the uterus then changes the retroversion into retroflexion.

As causes leading to a relaxation of the flexible part of the uterus and its ligaments, similar to that produced by the lying in, habitual over-distension of the bladder and rectum, interrupted coitus, and onanism have been cited. Traumatism can only produce retroflexion when at the moment of its action the uterus is in a position of retroversion, into which it has been pushed by a distended bladder. As aetiological influences upon the origin of backward bending of the body of the uterus, the causes given on page 129, sub-section 1, which produce retroversion, must be included. After this the abdominal pressure soon bends the retroverted flexible uterus backwards, and thus retroflexion arises.

Posterior peri-metric adhesions in retroflexion are secondary results of the anomalous position. It is less important, so far as treatment is concerned, to differentiate



FIG. 79.—After B. S. Schultze.

between primary and secondary adhesions than to make certain whether the uterus is fixed or not.

Symptoms.—1. *Those arising from the uterus.* As a result of the tension of the broad ligaments, which is inseparable from the dislocation, venous stasis takes place. The uterus enlarges. This causes bearing down and sacral pain, menstruation becomes profuse, the hyperæmic mucous membrane secretes more strongly, inflammation sets in, and finally the discharge becomes purulent.

2. *Symptoms arising from the adjacent organs.* These are frequent micturition, constipation, and painful enlargement with, finally, adhesion of the ovaries, which prolapse into Douglas's pouch. The dysuria is due to the pressure of the cervix, which is dislocated forwards upon the neck of the bladder. The constipation is due to the dread of pain on defæcation, which arises from the pressure of the fæces upon the prolapsed ovaries. Other authors explain the constipation as being due to the mechanical obstruction which the retroflexed uterus offers to the passage of the fæces.

3. *General symptoms.*—These are produced reflexly, and are very numerous indeed. They implicate the most varied nerve paths, and often produce the typical form of hysteria. Especially common is the complaint of head and stomach pains which disappear at once on reposition of the uterus. The general health often suffers in a remarkable manner from depression of spirits, defective appetite, and constant discharges. There is generally sterility as a result of endometritis. If the latter is not present, conception takes place readily, but abortion easily follows from incarceration of the retroflexed gravid uterus.

Diagnosis.—Bi-manually, the cervix is found markedly to the front and lying in the axis of the vagina, the fundus uteri is absent from the anterior vaginal fornix, but instead, there is felt from the posterior fornix or per rectum a tumour separable from the pelvic walls, which

passes into the cervix at an angle, and which, if adhesions are not present, allows itself to be pushed upwards out of the posterior fornix. If the cervix be now pressed backwards the tumour in the posterior fornix entirely disappears, and the fundus can be felt from the anterior fornix. The possibility of reposition thus proves the diagnosis to have been correct. But the diagnosis must be very clearly made before attempts are undertaken for reposition. Specially must the physician be very careful indeed in diagnosing retroflexion of the gravid uterus, and have previously excluded extra-uterine pregnancy. If reposition of the supposed uterine body be attempted in the latter case, rupture of the sac and death may follow. The same result may occur if a pyosalpinx has been overlooked.

Treatment.—*This consists in the replacement of the uterus and its retention in the normal position.* The uterus cannot be replaced by pessaries, as for instance by Hodge's lever pessary. The opposite opinion was formerly asserted and still haunts many brains to the injury of patients. The former usual practice of reposition with the sound has been superseded in every way by the methods of B. S. Schultze and Küstner. The first method, which is bi-manual, consists in pushing up the fundus with one or two fingers in the posterior fornix, or, in case this is shallow, per rectum, the external hand being pushed over the fundus to the posterior surface of the uterus, which is then drawn forwards. As soon as the fundus is fixed by the outer hand the fingers of the other hand are withdrawn from the posterior fornix and passed into the anterior and used to pull the cervix backwards. If the index finger has been passed into the rectum, the thumb is used to obtain this pressure on the cervix. This method succeeds well with a slack abdominal wall, or under anæsthesia, but demands great practice. This explains the fact that many practitioners renounce from the beginning all idea of replacing the retroflexed uterus, and are satisfied with putting in a pessary.

The bi-manual method of reposition is much facilitated by the use of Brandt's sofa (see p. 11) as compared with the use of the ordinary examination couch. For the inexperienced, the second method is much easier and far less dangerous, if the uterus is mobile. This method employs the volsella as well as the bi-manual manipulation. The anterior cervical lip is drawn downwards with the volsella, and thus the retroflexion is converted into a retroversion, and the fundus is brought nearer the anterior belly wall. In this way the posterior uterine surface is more accessible for both the inner and the outer hands. One or two fingers of the left hand are used in the posterior fornix—it is not necessary to work by the rectum as a rule, and only one finger is then used—to push the fundus uteri forwards, while the volsella are held with the fourth and fifth fingers of the same hand. It is now easy to pass the outer hand behind the fundus and draw it forwards. As soon as the outer hand has got possession of the fundus the inner fingers are slipped into the anterior fornix and made to push the cervix backwards. If assistants are at hand it is better to hand over the volsella to an assistant, who keeps up equable traction and pushes the volsella upwards and backwards as soon as the operator's outer hand has seized the fundus.

In many cases, replacement is effected by simply drawing down the cervix with the volsella, and then quickly pushing these upwards and backwards. By means of Küstner's method replacement is effected, without exception, when the uterus is mobile, and in many cases even when it is adherent. In the latter case, the adhesions are forcibly stretched. If the adhesions are of parametritic origin there is no danger, but when they are perimetritic an exacerbation of the inflammation may be caused. The author has seen this take place to a slight degree once or twice out of a great number of cases. But he has always endeavoured to ascertain beforehand whether the residua of the peri-metritis were of a gonorrhœic nature and associated with disease of the appendages themselves. A

practical point is the fact that replacement may absolutely fail at the first attempt on a fixed retroflexed uterus, and yet a few days afterwards a second attempt succeeds without any difficulty. The writer, therefore, never uses force in replacing the uterus with the volsella, but orders hot vaginal douches to relax the adhesions, and tells the patient to return in a few days. With experience, the cases become more and more rare in which it is necessary to use anæsthetics to get a successful issue. And one more and more often finds that a case which was irreducible before is also irreducible under anæsthesia. This is the case where dense perimetritic adhesions fix the posterior wall of the uterus to the rectum, or where abnormal ovarian adhesions render reduction an impossibility. Another method of B. S. Schultze's is here applicable, to wit, the direct breaking down of the adhesions under deep anæsthesia. First: their situation, extent, and shape are made out by two fingers of the left hand placed in the rectum, the thumb lying in the vagina and the other hand manipulating the belly wall from outside. The fingers, which are made to work against one another, separate the adhesions as close to the uterus as possible, and work these away from the uterus with as little force as possible.

The separation of the fixed ovaries should be performed in the same manner. Schultze has not seen any evil consequences; but severe bleeding may occur. This procedure cannot, therefore, be used whilst a patient is about, for such severe internal hæmorrhage may take place that laparotomy will be required. The author, who has practised this procedure very frequently, has often seen exudations about the freed ovaries in the pouch of Douglas, and these have very quickly become absorbed again. In many cases where this method fails, it is still possible to free the ovaries and uterus from their adhesions by means of massage and extension continued for months after the method of Thure Brandt. In such cases laparotomy has often been performed, the diseased appendages

have been removed, or the perimetritic adhesion separated, and, as a rule, the fundus of the uterus stitched to the anterior abdominal wall (see Ventrofixation).

The replaced Uterus must be retained in the Normal Position.—The natural supports are not sufficient for this, either because they have become relaxed, or because the tension of the abnormal adhesions overcomes them. The most usual practice consists in the use of a pessary. The best pessaries from the author's view are those introduced by Schultze and made of celluloid. They can be left for months without exciting any vaginal secretion—an evil which is inseparable from the use of soft rubber ring pessaries. The celluloid rings also differ from the hard rubber rings in retaining any shape which the physician may have given them after softening them in hot water. It is an advantage to shape the pessary oneself. The instruments sold are, as a rule, too little curved. The sizes most commonly used are Nos. 8 and 9, that is, rings having a diameter of 8 and 9 cm. ($3 - 3\frac{1}{2}$ inches) respectively. These are dipped into boiling water, and then pinched into a beak shape at one end. This end is pushed down whilst the larger end is bent upwards. We get thus a smaller anterior hoop which lies in the anterior fornix, and a larger posterior hoop in the posterior fornix (Ring-shaped: Hodge, Fig. 80). The cervix lies in the hollow of the ring, the concavity of which looks upwards. The anterior loop is bent downwards at its apex to avoid pressure on the urethra.



FIG. 80.

The pessary takes its support from the pelvic floor. It holds the uterus in its normal position because the posterior loop pushes the posterior vaginal fornix, and with it the cervix, backwards and upwards. The fundus must then of necessity lie forwards.

The pessary is introduced as follows: the thumb and forefinger of the left hand separate the labia above, while the thumb and forefinger of the right hand grasp the greased pessary by the right side of the greater loop, and

incline the pessary so that its larger concavity looks to the right. In this position the pessary is introduced within the vulva. This is elongated by pressing the right forefinger, which holds the pessary, strongly downwards against the perinæum. As soon as the posterior segment of the pessary has entered the vagina the right forefinger slips into the loop and pulls the pessary round so that its concavity looks upwards, and presses the pessary at the same time so that its upper end first sinks below and then rises behind the cervix. If the pessary is very bent, it must be introduced so that its concavity looks not directly to the right, but to the right and upwards. Otherwise, the upper loop presses so tightly into the right vaginal wall that it is only with difficulty that the forefinger can reach it to turn it round. This is especially the case with Thomas's pessaries. These are hard rubber pessaries whose upper loop is very thick and not bent. In a few cases, where the uterus remains fixed and is readily drawn back into its faulty position by the adhesions, they are to be preferred to a Hodge pessary. As a rule, however, a Hodge pessary with a wide and well-curved upper loop draws the uterus into better anteversion than a Thomas does. Schultze uses almost exclusively very bent Hodge pessaries, which resemble a Thomas in shape completely, but have not the thick upper ring. He also uses figure-of-eight pessaries. In these the lesser ring holds the cervix, whilst the larger one finds its support from the soft parts of the pelvic floor.

After the introduction of the ring, a bi-manual examination is made to see whether the uterus is in good position, that is, anteverted and anteflexed, and then the patient is allowed to walk about. There should be no pain, not even a feeling that there is a foreign body in the vagina. After a few days—at once if there is pain—the patient must return, and again a bi-manual examination is made to see if the uterus has kept its normal position in the pessary. If it has not, then the pessary is removed and the uterus replaced again, and a more curved or larger

pessary, as the case may be, is introduced. When the already described fibrous bands in the upper part of the broad ligaments (parametritis superior) are present it is very important to widen the upper loop of the pessary as much as possible; or otherwise, the uterus is drawn laterally past the upper part of the pessary and then slips behind it. When the patient has no discomfort, a celluloid pessary requires removal only every six months for cleaning. Douching need only be practised during menstruation if the pessary is celluloid, and then only twice daily. For this a $\frac{1}{4}$ per cent solution of lysol (1 teaspoonful to 1 litre of warm water) is ordered. With other pessaries, such as the flexible rubber one (copper-wire covered with rubber), douching twice a day is necessary, and the pessary must be taken out every four to eight weeks.

By treatment with pessaries a permanent cure¹ may be obtained in varying periods of time, that is, the uterus retains its normal position without a pessary. The quickest cures are obtained by treating retroflexion immediately after or during the puerperium (fourteen days after delivery). In these cases a three to six months wearing of the pessary will secure complete recovery. There is also a good prognosis in many cases of fixed retroflexion when it has been possible to stretch the adhesions so much that the uterus can be replaced and a pessary introduced. The adhesions are still further stretched by the pessary, until finally there is no abnormal tension from the adhesions which can pull the uterus back into a false position.

¹ [Note on pessaries:—All pessaries are more or less objectionable, even those recommended by the author. Celluloid pessaries do not retain their shape within the vagina, and the only ones that can be trusted to remain in position for several months without removal are the aluminium, block tin, or vulcanite pessaries. All pessaries act on a wrong principle. By stretching the vagina, and especially the posterior *cul de sac*, they tend to perpetuate the causes of displacement. In following the directions for introduction given in the text, it must be remembered that the patient is supposed to be lying in the dorsal position.—J. W. T.]

Treatment must afterwards be directed to restore the tone of the muscles in the broad ligaments by means of cold baths, cold vaginal douches, and clysters used on rising and going to bed, and after movement of the bowels, and in quite recent cases, by giving ergot (B. S. Schultze).

Continuous supervision by the practitioner is required for the safe practice of pessary treatment, especially in those cases where the pessary has been introduced after successful reduction of the uterus, but with perimetritic fixation of the uterus or ovaries still present. The pessary may at times lead to aggravation of the perimetritis. But even with a mobile retroflexion the pessary may directly excite perimetritis and thus lead to a fixed retroflexion, if the patient take the pessary out herself and then replaces it when the uterus has fallen away into retroflexion again.

This is naturally the case also when a practitioner introduces a pessary without reducing the uterus, and expects the ring to produce replacement of the retroflexed uterus. A ring which is left too long may also cause disorders endangering life or even causing death. Neugebauer junior has collected 255 of such cases. Of these eight women died directly from the deleterious effects of the pessary (peritonitis, sepsis); eight had cancer, apparently caused by the irritation of the pessary; in twenty-three there was perforation of the rectum; in twenty of the bladder; in ten both of these viscera were affected; two had uretero-vaginal fistulæ; in four the pessary had passed into the cellular tissue of the pelvis or into Douglas's pouch; and in six into the uterus. Such disasters for the most part depend upon the carelessness of the patients; for example, in the case of Colombat, which Neugebauer cites, a seventy-five year old patient had quite forgotten that a pessary had been introduced thirty years before; as a result of the fœtid discharge and unbearable pains, the diagnosis of carcinoma of the uterus was made! Such cases are met with even to-day.

Since continuous dependence upon the practitioner is

very uncomfortable for the patient, since they feel much more like invalids after treatment with the pessary, since pessary treatment is impossible when the uterus is fixed, and since, as just mentioned, any neglect by the patient may lead to grave disorders of health, attempts have been made, both operative and non-operative, for the cure of retroflexion of the uterus in other ways.

The non-operative method is that of Thure Brandt, and consists in daily elevations of the previously replaced uterus. One must have seen the method in practice and carried it out under a trained physician in order to use the method with success. For this reason a detailed description seems to the author to be superfluous. That this method has cured a whole series of cases permanently is undoubted. The author saw this himself when visiting Stockholm. A disadvantage is the long duration of the daily treatment, extending possibly for months, and the uncertainty of prognosis. The operative methods are as follows:—

1. The Alexander Adams Operation.

This consists in shortening the round ligaments. They are sought for at their peripheral ends and drawn forwards out of the inguinal canal. This operation has not found much favour in Germany, because poor results are frequent. Lately Werth has published some very successful cases of this method.

2. Ventrofixation of the Uterus.

This consists in abdominal section, and in stitching the uterus or its lateral ligaments to the anterior abdominal wall (Koeberlé, Olshausen, Säger, Leopold).

3. Vaginal Fixation of the Uterus.

(a) Fixation of the cervix backwards by shortening of the folds of Douglas (Frommel, Säger).

(b) Fixation of the fundus forwards.

The most sure method of fixation forwards, and the most certain mode of operating, the author thinks, is the one used by himself, and tested in 250 cases. This method was, in its main outlines, first described by Säger, but was afterwards given up by him as not securing the required result.

The method of vaginal-fixation carried out by me from

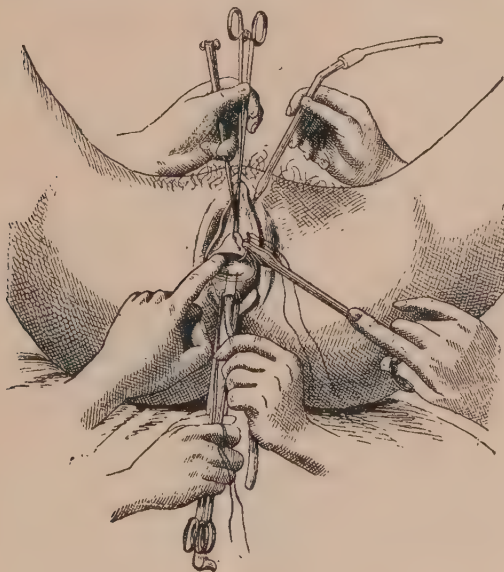


Fig. 81.

the 12th to the 152nd case is as follows:—First, any para- or peri-metric bands are stretched, and the uterus and ovaries freed from adhesions by the method of B. S. Schultze. After thorough disinfection of the external genitals, the surrounding parts, and vagina with 1 per cent solution of lysol, the posterior blade of Simon's speculum is introduced, the anterior cervical lip is seized with two pairs of volsella, and the uterus is washed out with the

lysol solution and curetted. The bladder is pushed upward and forward with a male catheter, the portio is then drawn down to the vulva by the assistant standing on the right; the operator now makes a superficial incision transversely 1 cm. long over the insertion of the anterior vaginal wall into the cervix, he seizes the upper wound margin with volsella, and has it drawn strongly upwards

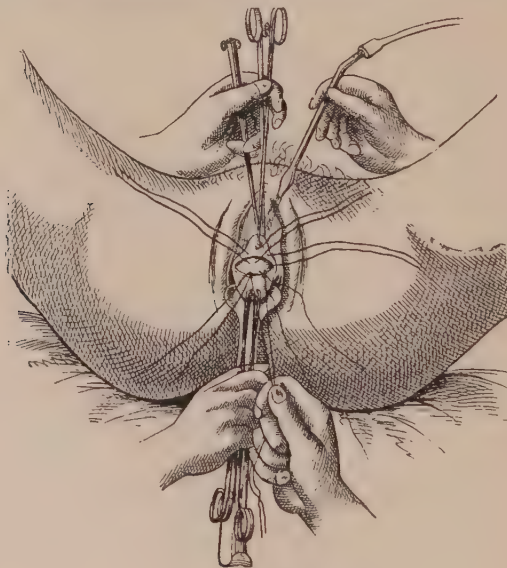


Fig. 82.

while he deepens the incision with scissors, and lengthens it on both sides by 1 cm. When the incision divides the pelvic fascia, as was always the case in multiparæ, the bladder is separated easily from the uterus with the tip of the left forefinger. The operator then passes a sound, curved like a Fritsch Bozemann catheter, into the uterus. With this the left assistant, who so far has only looked after the douching of the field of operation with a 1 per

cent lysol solution, presses the uterus against the operator's left forefinger by depressing the handle of the sound. Guided by this finger, the operator gets hold of the anterior uterine wall as high as possible with a transverse silk suture which is not tied but is drawn strongly downward by the right assistant (Fig. 81). In this way a second, third, and even fourth ligature, each a bit higher

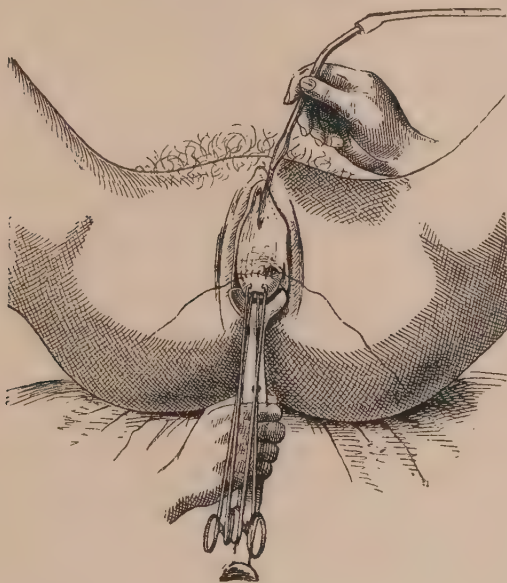


Fig. 83.

than the other, are passed through the anterior uterine wall, so that the last silk catches the uterus at the level of the top of the sound.

By pulling strongly, especially on the topmost ligature—whereupon the left assistant must withdraw the sound a little—the operator can pass three sagittal sutures which are entered at the margin of the wound in the vaginal fornix, and include the anterior vaginal wall, with

the exception of its mucous membrane, and then the uterine body (Fig. 82). After tying these sutures the provisional traction ligatures are removed, the three sutures are cut short and completely buried by closing the wound in the vaginal vault with continuous catgut sutures (Fig. 83). After removing the uterine sound the uterus is washed out, and the vagina is tamponaded with iodoform gauze. I used silk for the fixation sutures up to the 139th case, and then chromic catgut dry sterilised by Döderlein's method for the cases from 140 to 152. This change was made because the buried silk sutures made their way into the bladder in a series of cases and caused calculi to form. But the catgut did not cause a sufficiently firm adhesion of the fundus with the anterior vaginal wall, so that from case 153 I entirely gave up the principle of burying the fixation sutures and passed them through the entire thickness of the vaginal wall, removing them in from four to eight weeks. From case 165 I did not use silk any more for these stitches, but silkworm gut, so as to be able to leave them as long as possible without wearying the patient with the profuse discharge which occurs so commonly from silk sutures. I also, from case 153, returned to a method of suturing the vaginal wound which was used in the first cases, whereby the wound is closed sagittally, and the portio is thus driven further backwards.

By these methods I have obtained a permanent cure for more than three years in all cases of mobile retroflexion where great enlargement of the uterus from the chronic metritis was absent. For these cases a wedge-shaped excision of the cervix was combined with vaginofixation.

The word "cure" must here be taken to mean not only that the position of the uterus became normal, but that the patient was rendered sound, that she lost all the disorders produced by the retroflexion, without the functions of the uterus being in any way limited; menstruation became regular, and sterility due to retroflexion or its complications was frequently removed.

Pregnancy progressed without trouble, and labour left no after effect which was at all connected with the previous operation.

The improved position of the uterus obtained by the operation continued also, after pregnancy and labour, with simple care for good involution of the uterus (regulated diet, frequent action of the bowels and bladder, and the lateral abdominal position from the eighth day on).

In order to make the field of operation more visible, and to separate the adhesions of the uterus and ovaries, in case of fixed retroflexion, directly under guidance of the eye, I have opened the peritoneum in my last sixty cases. The method then became exactly like the already described vaginal laparotomy (see p. 54). If the adnexa are quite normal, the fundus is only drawn down as far as the wound and sutured with two silkworm gut sutures to the vaginal wound wall. In other cases the uterus is drawn down to the vulva, the perimetritic adhesions of the uterus with the tubes and ovaries, and of these with one another, are divided upon a director with Paquelin's cautery, and cystic ovarian follicles are opened with this also. Then two silkworm gut sutures are passed through the fundus and the vaginal wall, the adnexa and the uterus are replaced, the sutures tied, and the vaginal wound sutured up in a sagittal direction.

With this intra-peritoneal vaginal fixation I have observed no septic disease, no fatal case, and not a single relapse.

Technically ventral fixation is easier, especially in fixed retroflexion, but I prefer the described intra-peritoneal vaginal fixation on the following grounds:—

1. The intra-peritoneal vaginal fixation is less dangerous.

2. There is no possibility of a ventral hernia, of omental adhesion to the abdominal incision, or of ileus.

3. The patient does not, as in ventral fixation, exchange one bandage for another.

4. The convalescence is much shorter (eight to nine days), and capability for work comes on much sooner.

5. The anxiety of the patient is much less for vaginal than for ventral laparotomy, and one can therefore much oftener replace palliative by radical treatment, which Fritsch points out to be thoroughly correct practice.

6. The subjective troubles immediately after operation are also much less after vaginal fixation.

7. By intra-peritoneal vaginal fixation normal ante-versionflexion is obtained.

The indications for an operation depend upon its practicability and freedom from danger, as well as on the importance of the affliction. My vaginal fixation, in combination with curetting, is not more dangerous than curetting alone. In 250 cases I had only one death (0·4 per cent), while the mortality of curetting in well-conducted clinics is 0·5 per cent. In 99 per cent of cases of retroflexion there is endometritis present which does not disappear on reposition and retention of the uterus by a pessary, and for the cure of which curetting is necessary. Since curetting and vaginal fixation are not more dangerous than curetting alone, it would be quite illogical if we confined ourselves to a symptomatic treatment when the radical treatment is not more dangerous. Certainly in my opinion it is our duty to carry out vaginal fixation in the following cases, or at least to propose it to the patient:—

1. In cases of retroflexion where any vaginal operation ought to be undertaken, such as curetting, operations on the portio, colpoperineorrhaphy.

2. In cases where a pessary is not tolerated on account of pressure on perimetritic bands or fixed ovaries.

3. In cases of fixed retroflexion.

4. In cases where there is no guarantee that the patient will be under the care of a physician while wearing a pessary.

5. In cases where the patient, owing to a feeling of continuous depression due to her dependence upon her physician, lapses into a condition of psychical depression or hysteria.

I only exclude from treatment by vaginal fixation those cases of retroflexion which one meets with soon after labour, and where complications which require further treatment are wanting.

The frequency of retroflexion—16-19 per cent of all gynæcological cases—justifies the detailed description of its treatment, especially as no such extensive series of operations, together with the knowledge of their later results such as I have gained by my method, are available.

Descent and Prolapse of the Uterus and Vagina.

Definition, Ætiology, and Varieties of Prolapse.—By descent of the vagina we mean the condition in which the vaginal walls come down between, or partly outside, the labia; by prolapse of the vagina we mean the condition in which the vaginal walls have passed outside the labia altogether. The uterus suffers an alteration of position in these conditions, so that in descent of the vagina the cervix comes below the ischial spinal line; and in prolapse of the vagina outside the vulva. In the latter case the os uteri is exposed to view. The fundus uteri retains its normal elevation, as a rule, in these cases¹ (*F*, Fig. 85). Of course this is only made possible by marked extension of the neck of the uterus, effected through the vaginal walls which are inserted into it. (*elongatio colli*). Since the cervix is drawn forcibly to the front the uterus cannot retain its normal antelexion, but is retroverted. It is only in rare cases where the uterine supports are much relaxed that the uterus is truly prolapsed, that is, it lies outside the vulva in a sac formed of the prolapsed vagina. Usually the vaginal

¹ [Hypertrophic elongation of the cervix is not so common, at all events in England, as might be supposed from the author's description. In most cases of prolapse or protrusion the sound will not be found to pass beyond the usual distance. Hypertrophic elongation occurs in a minority of the cases.—J. W. T.]

prolapse is primary even in these cases. The uterus only exceptionally prolapses primarily, and then draws the vaginal walls with it. The causes of such *primary* uterine prolapse are relaxation of the suspensory ligaments of the uterus and increase of abdominal pressure. Both causes can produce primary prolapse of the uterus even in virgins. The term prolapse of the uterus should not be given indiscriminately to these two different positions of the uterus.

It would be much better to term the first condition "Vaginal prolapse with cervical elongation."

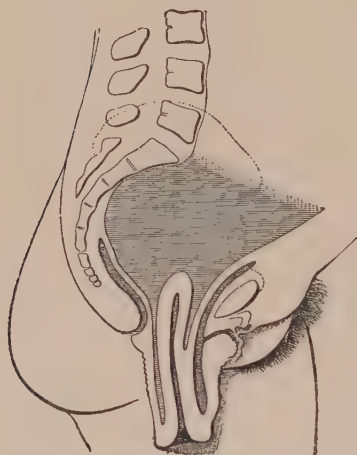


FIG. 84.—After B. S. Schultze.

The commonest cause of vaginal prolapse is labour, and of the accidents of labour, perinæal lacerations of the first and second degree play a leading part in producing this condition. When a perinæal tear does not unite at once, the anterior vaginal wall loses its support from the posterior wall. The lower portion of it soon prolapses and gradually drags the other part after it. Even without rupture of the perinæum prolapse of the vaginal walls can take place. The reason lies in the overstretching or subcutaneous rupture of the musculature of the pelvic floor (Schatz), or in defective involution of the genitals. In all three conditions there is gaping of the vulva, while the perinæum is intact. As a consequence the loose folds of the vaginal walls easily come outside, especially on getting up and working too early after confinement. Thus we see vaginal prolapse as a very common disease in the

labouring classes, where the women cannot even keep their lying-in owing to their poverty. Ascites can also sometimes cause vaginal prolapse. Hegar and Kaltenbach were able to allow the fluid to drain off in such a case by opening the depressed plica vesico-uterina.

Finally, the vagina may prolapse in old women as a result of the disappearance of fat around it. The posterior

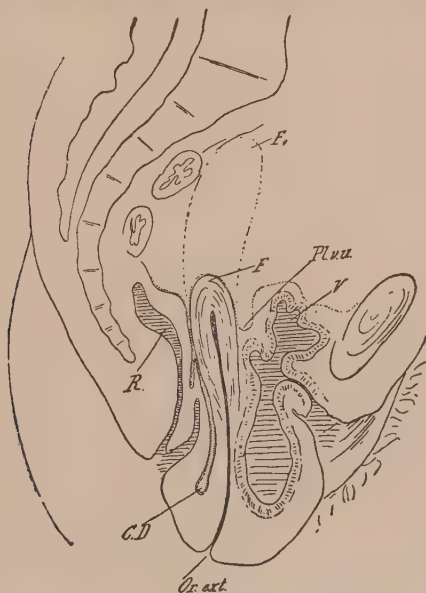


FIG. 85.—Prolapse of the anterior vaginal wall with elongation of the cervix and descent of the retroverted uterus. Diagram of a frozen section of a preparation from the obstetrical clinic of the Charité.

vaginal wall is partly exposed to view in old perinæal lacerations, it is everted, but it seldom is completely prolapsed (as in Fig. 84), because it is retained in its place by the muscles of the pelvic floor. In most of the cases of vaginal prolapse with cervical elongation one therefore finds that the anterior vaginal wall is com-

pletely prolapsed, whilst the finger can still be introduced behind the cervix into the vagina for a greater or lesser distance (Fig. 85). In these cases the supra-vaginal portion of the cervix is not elongated, but the portion called intermediate by Schröder is elongated. If the hypertrophy affects the supravaginal portion also, the posterior vaginal vault must descend, and thus a secondary sinking or prolapse of the posterior vaginal wall is formed. A bellying of the bladder into the prolapse is usually associated with anterior vaginal prolapse (Cystocele; *CD*, Figs. 84 and 85). It is less common for rectocele to be present with prolapse of the posterior vaginal wall.

The following varieties of sinking and prolapse are therefore differentiated:—

1. Descent of the anterior vaginal wall
 2. Do. of the posterior vaginal wall
 3. Do. of both vaginal walls
 4. Primary prolapse of both vaginal walls—
- | | | |
|---|---|--|
| <ol style="list-style-type: none"> (a) with elongatio colli and retroversio uteri; (b) with secondary descent of a retroverted uterus or prolapsus uteri. | } | with or without descent of the uterus. |
|---|---|--|

5. Primary prolapse of the anterior vaginal wall, with elongatio colli and retroversion of the uterus (commonest form), which may pass into—

6. Primary prolapse of the anterior vaginal wall with elongatio colli, retroversion of the uterus, and secondary depression of the posterior vaginal vault, which latter may increase to complete prolapse of the posterior vaginal wall.

7. Primary prolapse of the uterus, with secondary prolapse of both vaginal walls.

Symptoms.—These are a feeling of gaping of the vulva; bearing down; sacral pain; a feeling as if a foreign body were in the vulva; difficulty in micturition, and pain due to mechanical injuries of the prolapsed parts, injuries which often lead to extensive ulceration. By degrees the prolapse, which at first only came down

on severe straining and went back spontaneously, or was easily pushed back by the patient, remains outside permanently. Finally, the patient cannot replace it at all on account of the great increase in size (from venous stasis), or from inflammatory adhesions. Symptoms of shock may be present in acute primary prolapse of the uterus. If pregnancy ensues, which is quite possible, the growing uterus draws the previously fallen vaginal walls more or less upwards. As a consequence of retroversion we may get incarceration of the retroflexed gravid uterus (G. Veit).

Diagnosis.—This is very simple after the previous statements. Usually the patient comes with the diagnosis ready made of prolapse. In prolapse of the anterior vaginal wall this lies exposed to view in its whole length from the meatus urethræ to the cervix. The anterior vaginal fornix is obliterated. Cystocele is proved to exist by the catheter taking a downward direction in the bladder. Occasionally one sees the hypertrophied portio and the widely open os uteri as part of the swelling protruding in the vulva. If the posterior vaginal wall is not prolapsed, then the posterior fornix is retained, and by examining bi-manually from this fornix one can feel the retroverted uterus. When both vaginal walls are prolapsed, the uterine position and a certain amount of rectocele are to be made out from the rectum.

As the prolapse often goes back under restful conditions it is well to ask the patient to cough or bear down before examination, or the uterus may be drawn downwards with the volsella as far as it will come without resistance. That in such cases the prolapse is a reality is easily perceived from the dry skin-like state of the prolapsed mucous membrane. As concerns differential diagnosis, the isolated penis- or trunk-shaped hypertrophy of the cervix comes into consideration. In this a swelling projects from the vulva, which has the os uteri as its apex. Yet it can be established that both vaginal fornices remain at their normal height.

Cysts of the vulva and vagina may also be mistaken for prolapse. But one finds in these cases that the uterus and the vaginal vaults stand at their normal level.

Prognosis.—Prolapse is a very grave evil, which takes away the capacity for both labour and pleasure, and which may lead to fatal septicæmia by the strangulation and gangrene of the prolapsed parts, and may also cause kidney and bladder disorders.

Treatment.—The prophylactic treatment of prolapse lies in the rational management of labour and of the lying-in. The use of incisions for the relief of very great obstruction by the soft parts during delivery is of considerable importance, so also is the careful suture of even the smallest laceration or incision. This suture, if necessary, is renewed during the puerperium when primary union has not taken place.

After the first labour the patient should keep her bed for fourteen days. Severe compression by the binder must be avoided, and care must be taken to keep the bowels open, and to use the catheter if necessary. After leaving her bed, the patient must do no hard work. Prolapse is overwhelmingly a disease of the lower classes, who cannot carry out these hygienic demands.

For small degrees of descent without perinæal laceration, which come for treatment soon after labour, one orders cold astringent douches (one to four teaspoonfuls of alum in two pints of water), and puts in temporarily as small a Mayer's ring as possible. Any subinvolution of the uterus is treated with ergot, and endometritis with curetting. If care be taken to secure involution of the genitals by these means, the descent may get well of itself.

A true prolapse can only be cured by operative means, and cannot be cured by pessaries. Pessaries keep the prolapse up, but only by abnormally stretching the vagina. Thus the vagina stretches still more, and a larger ring becomes necessary, until at last no ring will keep the prolapse up.

The use of pessaries in the treatment of prolapse is therefore to be rejected on principle.

A ring is used only in old decrepit patients, and in such as refuse operation. The rings most liked are the soft rubber ones of Mayer (Fig. 86). A ring of this kind causes kolpitis, with profuse foul discharges, unless it be removed every four to eight weeks, and the patient be diligently douched.



FIG. 86.

E. Martin's round hard rubber rings are more suitable.¹ These have a long stem which projects from the vagina after the pessary has been introduced. The pessaries keep the prolapse back better, and are not forced out by the patient, because the stem becomes pressed against the pubes as soon as the ring turns crosswise in the vagina, and thus the stem prevents the ring tipping upon its side and slipping out. Lastly, these rings do not excite so much secretion.

In complete prolapse of the anterior and posterior vaginal walls, with elongation of the cervix, the operative treatment consists of the following methods, which can generally be completed at one sitting:—

1. Operations on the uterus.

- (a) Abrasio mucosæ (curetting);
- (b) Vagino-fixatio uteri retroversi.
- (c) Amputatio portionis vaginalis cervicis.

2. Operations on the vagina and perinæum.

- (a) Anterior kolporrhaphy, or elytrorrhaphy;
- (b) Posterior kolporrhaphy, or kolpoperineorrhaphy, or perineorrhaphy.

¹ [The analogous pessaries used in England for this condition are (a) the shelf-pessary of Simpson, and (b) the pessary of Zwanke. Both are solid pessaries of vulcanite or hard rubber, furnished with a vaginal stem, and both are effective in keeping up severe cases of protrusion. The shelf-pessary is the simpler instrument. It is made "in one piece" and cannot break. Zwanke's pessary is in three pieces, united by a screw-joint. It is easy of introduction, but always becomes broken in use.—J. W. T.]

1. Curetting of the interior of the uterus is used to cure the endometritis which is so often present, while amputation of the cervix will directly remove the circular hypertrophy, and indirectly, through involution of the whole uterus, the supravaginal elongation or hypertrophy.

Vaginal fixation should be carried out in all cases where the uterus is retroverted or retroflexed. Most of the relapses after primarily successful operations for prolapse depend upon the fact that until now the defective position of the uterus was left, then the uterus which lay in the vagina came down more, and partly pushed the vaginal walls apart and partly dragged them with it. By vaginal fixation, in combination with the other prolapse operations used before, even the largest prolapses may from my experience be permanently cured. The uterus fixed in anteflexion keeps the vaginal fornices at their normal level. I was the first (November 1891) to combine vaginal fixation with kolporrhaphy for the cure of prolapse. In a case operated upon soon after by this method, I can, three years later, still show a complete cure.

Anterior kolporrhaphy¹ consists in the excision of a

¹ [A better method of treatment for complete vaginal prolapse in the translators' opinion is that of double lateral kolporrhaphy. The uterus is fully drawn down by volsella, and an elliptical piece of mucous membrane is taken away all along the side of the vagina, from the cervix almost to the vaginal entrance, first on one side and then on the other. The amount of tissue removed depends on the redundancy or laxity of the vaginal walls. The resulting wounds are closed by a continuous running suture of fine silk which includes the submucous connective tissue, and the uterus is partially replaced before the sutures are drawn tight. In this way the vagina may be narrowed to almost any extent, and the double lateral cicatrix, involving the connective tissue on each side of the vagina, will often retain the uterus and vagina in perfect position afterwards.]

An operation to repair or strengthen the perinæum, after the method of Tait, or otherwise, should always accompany the kolporrhaphy. The continuous silk sutures come away of themselves (or on slight traction) after several days. The writer first used silkworm gut in interrupted sutures, but found it very difficult or impossible to remove these from the vaginal vault without injury to the consolidated bed of connective tissue, while catgut was proved to be unreliable. The finer catgut on sale in England is usually absorbed much too quickly, and surfaces (apparently) securely united by catgut sutures may completely open in three days, or even less, from premature absorption of the suture.—J. W. T.]

more or less wide oval piece of the anterior vaginal mucous membrane (Fig. 87). This begins 2 cm. ($\frac{4}{5}$ inch) behind the urethral meatus, and terminates right at the cervix, or at that height which can be drawn down with volsella without resistance to the vaginal outlet. The upper end of the oval is fixed with tenaculum forceps. Two assistants hold the labia apart so as to expose the whole field of operation to view. The breadth of the oval can be obtained by finding the points laterally, which can be made to meet in the middle line by pulling them together with forceps. The boundary incision is carried at the same depth through the whole mucous membrane. The flap marked out is seized with hooked forceps first, and then with two fingers, and, beginning above, is separated partly with a scalpel and partly by traction. The knife must always cut towards the flap, as otherwise too much tissue may be removed.

When the mucous membrane has not the necessary laxity for separation by the finger, the assistant on the right side presses the tissues upwards with his left forefinger above the operator's knife. Spurting vessels are temporarily seized. The wound is closed with either deep and superficial interrupted sutures, or by continuous suture of catgut. When deep and superficial interrupted sutures are used the deep sutures are passed under the whole wound surface, except at the middle, where the sutures are brought out and again inserted. Fig. 87 shows a case of prolapse of the anterior vaginal wall. Amputation of the cervix has been performed, and the parts are exposed by traction on the cervical sutures. In Figs. 87-89 are shown the three stages of continuous catgut suture for closure of the wound. From the left wound margin at *a*, Fig. 87, the suture is carried down in the centre of the wound surface, and brought up again over these first stitches, to emerge above at *c*, Fig. 88, at the right wound margin. [From *c* the suture is again carried downwards to *d*, this time bringing the edges of the wound together.] At *d*, Fig. 89, the loop is cut through,

the lower loop is tied, and then one of the ends of the knot is tied to the termination of the thread. The indi-

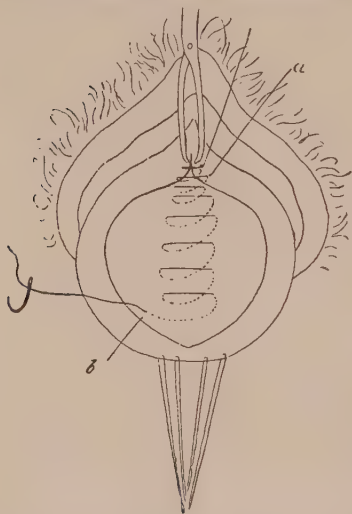


FIG. 87.

stitches are sufficient. In this case the suturing is begun

individual loops of the continuous suture are not figured as drawn tight, so that the points of insertion and emergence may be indicated. In practice the assistant on the right side of the operator seizes the suture as soon as it emerges, each time with the left hand, and draws it tight, while with his right hand he presses on the projecting wound-surface by means of forceps. When the oval flap excised is not very large two superimposed layers of

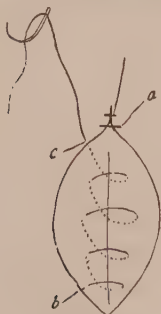


FIG. 88.

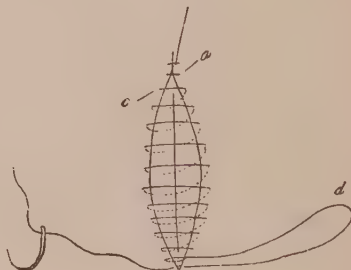


FIG. 89.

at *b*, Fig. 88, and carried upwards. One must always remember to transfix the loops of the deeper stages, and

then to carry the needle very superficially under the wound-surface, also when near the already sutured fold of the wound to insert and bring out the suture on different sides of the fold. The wound-fold is shown in Figs. 88 and 89 as a line.

The most useful form of posterior kolporrhaphy is that of Hegar.

Since most prolapses take place from laceration, or laxity of the pelvic floor and the recto-vaginal septum, a restoration of the perinæum or perineorrhaphy must always follow the posterior kolporrhaphy or elytrorrhaphy. In cases where the vagina is not specially lax and not in folds, Hegar combines the two methods into a kolpoperineorrhaphy, that is, the excision of a triangle whose base,



FIG. 90.—After Hegar-Kaltenbach.

which lies in the posterior commissure, has a breadth of 4-7 cm. (1.6 to 2.8 inches), and whose height is 5-9 cm. (2 to 3.6 inches) (Fig. 90). In posterior as in anterior kolporrhaphy an oval flap is encased. The upper end reaches to the posterior fornix. For the performance of kolpoperineorrhaphy the mucous membrane is seized in the middle line 5-9 cm. (2 to 3.6 inches) above the vaginal inlet with volsella. The same is done at the lower end of each labium majus 3-4 cm. (1.2 to 1.6 inches) from the perinæal raphé. The two latter pairs of volsella must be capable of approximation in the middle line without any great tension. They indicate the position of the new posterior commissure. The extent of the perinæum is increased by

half the base of the denuded triangle. The assistant on the left side now grasps with his right hand the upper forceps, pulls the point *c* down to the vaginal inlet, and takes the volsella on the left side with his left hand. His right hand also holds the irrigating tube in case there is not an extra assistant for this. The assistant on the right side seizes with his right hand the volsella on the right.

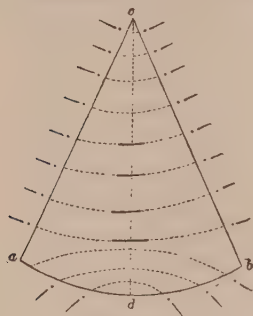


FIG. 91.

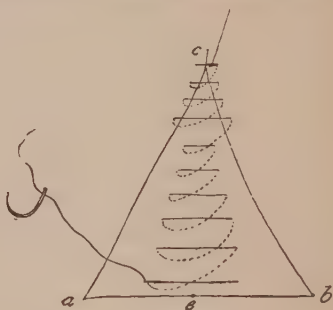


FIG. 92.

The operator now carries the incisions *ca* and *cb* through the mucous membrane to the depth of a few millimetres. The necessary extension of the tissues is obtained by using more forceps (Fig. 90), or more easily by the right assistant using his left finger as described previously in anterior kolporrhaphy, or by the same assistant passing his right forefinger into the rectum. He holds the volsella now in his left hand. The flap is prepared as in anterior kolporrhaphy. By cutting from *a* to *b* the flap is freed. The suturing, after Hegar, consists of deep interrupted sutures (see Fig. 91). Between two deep sutures a superficial or semi-deep suture is placed. Silkworm gut ligatures have the same advantage as silver wire in not acting as a seton, and their tying, which is done as for silk sutures, is more simple than the twisting up of silver wire. As a rule silkworm gut sutures should not be tied too tightly. Of late many operators prefer the continuous buried catgut suture of Werth and Bröse. By this means

the wound is closed sooner, and great tension does not make the accurate closure of the wound edges more difficult, while the removal of the sutures later is unnecessary. Naturally in this method much depends upon the asepsis

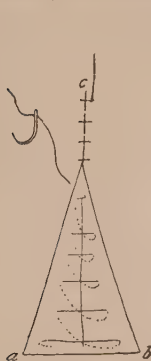


FIG. 93.

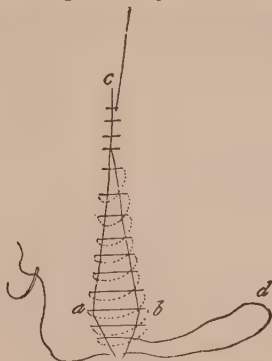


FIG. 94.

of the materials. The technique of continuous suturing is the same for posterior as for anterior kolporrhaphy. The edges of the wound must not be brought together from below upwards. By working in this direction the upper still unstitched portion of the wound is pushed into the vagina, and the suturing is made more difficult. Therefore on coming to the lower portion of the wound, even when the wound margins are only slightly separated, the surgeon carries the suture by a few sunken loops to the upper end, transfixing the right wound margin above, and stitching the edges together from this point downwards (Figs. 92-94). Or the continuous suture may be brought out on the right side at the lower end of the wound, and the wound margins stitched together with a second continuous suture from above downwards, the two sutures being tied together at the lower end.¹

By Hegar's kolpoperineorrhaphy the superfluous por-

¹ In Fig. 92 the suture could be brought out at *c* owing to the small distance between *a* and *b*. But it is recommended on the above-given grounds to always pass a buried suture upwards in the wound (Fig. 93).

tions of vagina are removed, and narrowing of the vagina and vulva results while they are pushed forwards. The latter happens because the recto-vaginal septum is increased by the amount which is obtained when the denuded triangle is folded from its apex downwards. The perineum itself is increased forward by half the base of the triangle. In this way the normal relations of the parts are re-established by Hegar's method.

With regard to the many transitional forms between chronic perineal lacerations and prolapse of the posterior vaginal wall it is not unimportant to observe that the shape of the denuded surface of Simon for old perineal lacerations (Fig. 46) may be anatomically derived from Hegar's figure. But in perineorrhaphy, as there is no intention of narrowing the vagina, it is not requisite to carry the apex of the triangle so high up the vagina as in Hegar's kolpoperineorrhaphy; it lies at c_1 instead of c (Fig. 95). If the simple triangle abc' be denuded, the perineum will have half the length of ab , but just above the perineum the recto-vaginal septum will be very thin. On this account the lateral corners of Hegar's triangle must be somewhat carried out and rounded off. The surface thus produced is that of Simon for incomplete laceration of the perineum. In complete laceration of the perineum



FIG. 95.

the figure is altered, since the base of Hegar's triangle is bent in by the tear in the anterior rectal wall. (This kink is shown in Fig. 95 by the dotted line.) Thus we obtain Simon's denudation in complete laceration of the perineum. Of late the German operators, at the instigation of Zweifel and Säger, have carried out

Lawson Tait's flap-splitting operation instead of Hegar's

kolpoperineorrhaphy. This method is very pleasing because of its facility and expedition, and also because it produces a much longer perineum than any other operation. In severe prolapse, where a great excess of tissue is implicated, this method is not sufficient. From the author's experiences it is only indicated where the perinæal laceration is the chief trouble and the prolapse is small. The flap-splitting operation, according to Säger, whose account

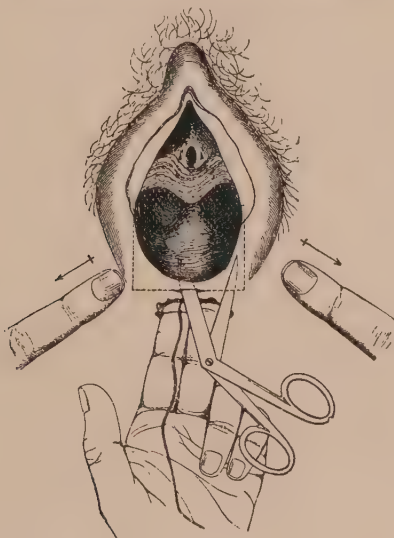


FIG. 96.—After Säger.

the author follows in every detail, is as follows for laceration of first and second degrees:—One begins by pushing a pledget of iodoform gauze into the rectum. By this the posterior vaginal wall is bellied forwards, and any faecal masses still remaining in the rectum are thus removed from the field of operations. By introducing the left forefinger into the rectum, as also by an assistant drawing the labia majora apart in the direction of the tubera ischii—a secondary help which is not always necessary—the

perinæum is stretched widely out, the vulva is dilated, and the posterior vaginal wall is exposed to view to a sufficient height. The point of the lower blade of a pair of elbowed scissors, held horizontally, is pushed in to the depth of about 1·5 to 3 cm. (see Fig. 97) in the middle line between the posterior commissure and the anal margin, and the recto-vaginal septum is split up first to the left, and then, after turning the scissors round, to the right (see Fig. 96). These transverse cuts end on each side at a vertical line, which is supposed to be drawn downwards a little outside the point where the labia majora and minora unite. In the direction of this line

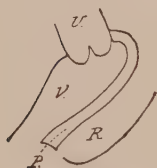


FIG. 97.—After Sanger.

the incision is continued on both sides, using scissors, from the end of the horizontal line, for 2·5 to 3 cm. (1 to 1·2 inches) upwards. These lateral incisions are about 3 cm. (1·2 inches) deep. A four-cornered vaginal flap is produced by these three incisions, and this is drawn upwards carefully with forceps, and the connective tissue at its base, which is

thus put on the stretch, is cut through gradually with the scissors. The raw surface thus formed has a six-sided shape (see Fig. 98). It is closed by interrupted transverse sutures, which are all passed entirely from the perinæum, and are carried under the whole depth of the wound. In doing this the finger in the rectum prevents any perforation of the bowel by the needle. The needle is passed first at *a* (Fig. 98). For this the assistant on the right side must stretch the margins of the wound with forceps, since the operator has only his right hand free.

When the last suture at *d* has been passed, the operator removes his finger from the rectum, disinfects it, and now seizes the upper margin of the vaginal flap between the thumb and middle finger of the left hand (the forefinger is better not used on account of its doubtful state from its previous position). Then a fine needle is passed in at

c, Fig. 98, is carried between the wound surface and the vaginal mucous membranes through the upper margin of the vaginal flap, and brought out again at *b*. This suture is now tied, and it brings the vaginal flap together like the lid of a tobacco pouch. Between this and *a* a third suture is passed and tied, and then the other sutures are tied from above down in order. If necessary a few superficial sutures are passed between these.

In chronic lacerations of the third degree the transverse incision is made better with a knife. The lateral incisions are then prolonged backwards 2 cm. (0·8 inch) so that

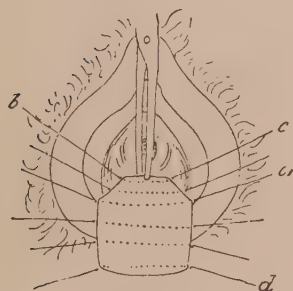


FIG. 98.



FIG. 99.

the figure takes the shape of the letter **H** (see Fig. 99). The vaginal flap which is formed in this way is drawn upwards, and the rectal one downwards (see Fig. 100). The wound has the shape of an octagon, and is sutured as above described. The rectal flap is pursed up by the same tobacco-pouch suture. The sutured wound is seen in Fig. 101. The upper portion becomes markedly less through contraction. The instrumentarium is the usual one. The angled scissors can also be dispensed with. Sharply curved needles, both small and extra large, are necessary. The author uses silkworm gut or silk, and has

had no failures. Since one has to pass so few stitches, the interrupted sutures can here be more quickly used than a continuous suture. If the tension is very great on tying, the wound edges are approximated by pulling on the whole lot of the previously passed deep sutures.

The advantages of this flap-splitting operation have

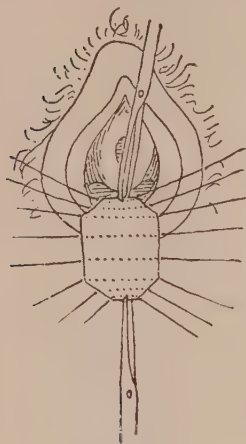


FIG 100.

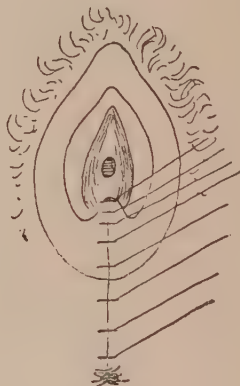


FIG. 101.

been given already on page 69. Van Langenbeck, Wilms, and Fritsch had already described and carried out similar flap operations before Lawson Tait.¹

The serial order of the operations described is as follows: *curetting, amputation, anterior kolporrhaphy, and*

¹ [On Tait's operation for ruptured perineum:—In operating by Lawson Tait's method the recto-vaginal septum is thoroughly split with elbowed scissors, and the ends of the incisions are carried upwards on the inner side of the labia so as not only to repair but to extend the perineum forwards. This is not represented in the sketches. From three to six silkworm gut sutures are passed beneath the raw surfaces from side to side by a handled needle with wide curvature. The lower sutures should be completely buried before tying. The upper sutures bring together the extending arms of the incision.—J. W. T.]

kolpoperineorrhaphy. In retroversion of the uterus I proceed as follows: I first open the plica vesico-uterina and stitch this to the lateral ends of the transverse incision (Fig. 102). I then excise a triangle from the anterior vaginal wall, the apex of which lies below the urethral swelling at *a*, the base coincides with the upper wound margin *c* of the transverse wound. The uterus is now drawn forward, its fundus is sutured to the vaginal wall immediately below *a* with two sutures, and the vaginal wound is closed sagittally.

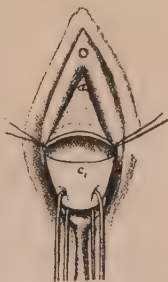


Fig. 102.

A wedge-shaped piece is then excised from both cervical lips, or one wedge out of the anterior cervical wall is removed (see p. 103). In the latter case the vaginal wound cannot be closed until the space in the anterior cervical wall has been closed. With this combination of four operations the patient may get up on the eighth day and be discharged next day. But if posterior kolporrhaphy or Tait's operation be done, the patient may only rise on the twelfth day, and be discharged after the fourteenth.

Of late vaginal extirpation of the uterus and removal of the vagina at the same time has been performed for very large chronic prolapses. In the cases operated upon by this method in the clinic of Gusserow, there always appeared to be some relapse even then, although perhaps small.

The author, therefore, in a case of his own, following the advice of A. Martin, after extirpation of the uterus and resection of the vagina, finished the operation by a kolpoperineorrhaphy.

The patient has been well for nine months. This operation is only justifiable when there is a very strong suspicion of malignant degeneration of the endometrium.

For the cure of prolapse alone, however big or chronic, one does not require these mutilating operations if one

cures the retroversion, complicating the prolapse, by vaginal fixation.

Inversion of the Uterus.

A recent inversion of the uterus is a subject for obstetric treatment. Its reposition is easy by manual pressure upon the highest part of the uterus, which is projecting into or out of the vagina like a polypus.

Chronic inversion arises from the non-reposition of an inversion which has taken place after labour. Nowadays cases of this description are observed more rarely, because of the much more rational conduct of the period after delivery. The rare inversions, due to the dragging of polypi, have become yet more rare, because the patients with polypi call in skilled medical assistance much earlier than formerly.

The symptoms are exhausting bleeding, profuse foul discharge, sacral pain, and bearing down. The mucous membrane of the uterus may ulcerate, and even gangrene may ensue from disturbance of the circulation.

The **diagnosis** is simple. The inverted uterus is diagnosed from a uterine polypus pushed into the vagina by finding that the fundus uteri is absent from its normal position, and the inversion groove can be felt per rectum. In addition, one proves that the wall of the suspicious tumour passes on every side into the cervix, and that there is no uterine cavity.

The **treatment** should in the first place aim at reposition.¹ This but seldom succeeds by manual treatment, when, for instance, the cervix is seized with volsella and drawn

¹ [On inversion of the uterus:—For the treatment of this condition, *elastic pressure* applied to the inverted fundus by means of the repositors of Avelong or Tait is so very satisfactory that it may be said to have replaced all other methods in this country. It very rarely fails even when “taxis” under deep anaesthesia has been unsuccessful, and its employment in the first place as a matter of course is strongly to be recommended. The acute or recent condition may usually be treated at once by manual reposition.—Tr.]

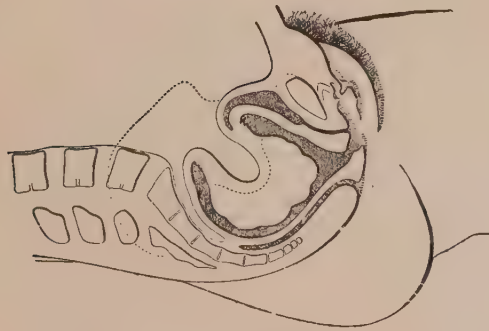


FIG. 103.



FIG. 104.



FIG. 105.

Figures 103-105 exhibit, according to B. S. Schultz, the three different stages of inversion in one and the same case. Figure 103=complete inversion involving the cervix caused by a myoma. The third degree of inversion. Figure 104=the fundus uteri still inverted and projecting into the vagina after emuculation of the tumour, the cervix has already reformed itself. The second degree of inversion. Figure 105=the fundus lies inverted above the internal os uteri. The first degree of inversion. This stage includes all cases of inversion where the fundus is still above the external os.

downwards, whilst the fundus is pushed upwards. Absolutely certain success is often obtained by keeping the vagina plugged for weeks with a kolpeurynter filled with water. Operative treatment of chronic inversion is therefore limited to a very few cases. This consists in putting an elastic ring over the parts and then removing the inverted tissues as high as possible, and suturing the wound with stitches, which include the peritoneum (Kaltenbach).

Hofmeier has proposed instead of this to perform total vaginal extirpation of the inverted uterus.

In place of these mutilating operations, Küstner has introduced a happily thought-out conservative operation. He opens the pouch of Douglas, and passes his finger through this into the cup of the inversion, he then splits the posterior uterine wall longitudinally above the external os uteri, and reinverts the uterus with his thumb while counter-pressure is made with the forefinger through Douglas's pouch. After thorough replacement of the uterus the uterine wall and Douglas's pouch are both sutured. The author would open the plica vesico-uterina and not the pouch of Douglas, so as to avoid troublesome adhesions.

If the inversion has been produced by tumours, these should be at once removed (Figs. 103-105). Of practical importance is the partial inversion, which is caused when one pulls a myoma with a short pedicle strongly downwards in order to remove it.

The pedicle of the myoma is then formed partly of inverted uterine wall. If the pedicle be now removed high up, the uterus will be widely cut through, and flooding may set in. It is therefore necessary to be certain whether a depression of the outer uterine surface is perceptible when the polypus is drawn upon, and, if so, the pedicle must be divided as low down as possible.

THE NEW GROWTHS OF THE UTERUS.

Myoma.

UTERINE myoma is a partial hyperplasia of the smooth muscle structure of the uterus. When the connective tissue preponderates in the new growth we speak of fibro-myoma or fibromata.

The latter are harder, poorer in blood-vessels, and accordingly of a whiter colour. In a single uterus there are usually many myomata present.

They occur first about puberty, but in special cases are already formed even in childhood, so that their origin may possibly be traced from birth (Leopold).

It appears to be proved that in the greater number of myomata the new growth starts from the muscular coat of the blood-vessels (Gottschalk).



FIG. 106.—After Gusserow.

According to their situation, these tumours are divided into “subserous,” “interstitial,” and “submucous” myomata of the uterine body and of the cervix. The former are more common than cervical myomata.

According to the definition of Gusserow, a subserous myoma is one which begins in the subperitoneal layers of the uterus and grows in the

direction of least resistance. It therefore tends to enlarge and protrude into the cavity of the peritoneum (Fig. 106).

If the tumour begins rather in the middle layers of the uterus, so that in spite of steady growth it is always surrounded by a thick layer of sound uterine muscle-tissue, we have to do with an interstitial (or intra-parietal) myoma.

Lastly, if the development begins in the muscle-layer lying immediately below the mucous membrane, and the growth of the tumour takes place chiefly into the cavity



FIG. 107.—After Gusserow.

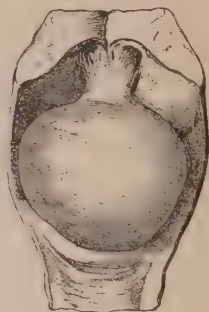


FIG. 108.—After Gusserow.

of the uterus, the myoma is described as “submucous” (Fig. 108), and as a polypus when it has a thin pedicle.

Subserous and submucous myomata have only a thin over-layer of serous or mucous membrane, while intra-parietal myomata lie in a “capsule,” with which they are usually connected by loose connective tissue only.

After splitting the capsule, the myoma may be removed by enucleation.

The capsule is usually hypertrophied with the adjacent uterine tissue itself, but may become so atrophied that in sounding, curetting, and during the use of an intra-uterine injection, perforation may take place.

Instead of growing freely into the abdominal cavity,

subserous myomata may extend laterally into the broad ligaments, and are then termed "intra-ligamentary."

These myomata have a capsule also which is developed from the thickened broad ligament.

Myomata may undergo various metamorphoses. Through œdema, myxomatous or fatty changes, they may soften or become cystic, and they may undergo calcareous putrid or malignant degeneration.

Enormous blood spaces may develop within their substance (myoma teleangiectodes s. cavernosum) or lymph-spaces (myoma lymphangiectodes).

Edematous infiltration comes on most frequently during pregnancy, or when the myoma is incarcerated in the pelvis: fatty degeneration during the lying in, so that a myoma which has attained a considerable size during pregnancy may clearly diminish in size during the lying in, and may almost—but very seldom completely—disappear.

Putrid or purulent degeneration arises from the entrance of some infectious germs, and is most frequently observed after operative interference or labour.

This degeneration can also arise spontaneously when submucous myomata are forced outwards into the vagina.

If the patient do not hereby succumb to pyæmia, the myoma, through a process of inflammatory separation, may become thrown off, and in this way a natural cure result. These are the cases where a patient, given up by her doctor on account of presumptive carcinoma of the uterus, becomes cured of her cancer by the use of some indifferent prescription.

The spontaneous "birth" of a myoma may further occur from uterine contraction only, as when the pedicle of a polypus is torn through.

The chief symptoms of myoma are bleeding and pain. Hæmorrhage arises as a consequence of consecutive inflammation of the uterine mucous membrane (Wyder). It is most severe in submucous and least in the subserous myomata. In the former the menstrual type may be

completely lost, a metrorrhagia developing from menorrhagia.

In later stages, when the patient has become thoroughly exsanguine, the hæmorrhage is often replaced by a slimy or muco-purulent discharge.

In the beginning pain occurs mostly only during menstruation (dysmenorrhœa) especially with interstitial myomata. In submucous tumours the pain has the characteristics of "labour pains." Contractions are excited which dilate the os uteri. If the myoma be complicated with perimetritis—perimetritis appears very frequently as perioophitis and perisalpingitis—more or less constant pain is complained of. The growth of the tumour moreover produces abnormal sensations of all kinds in the abdomen, such as a feeling of fulness, weight in the pelvis, "bearing-down," dysuria, and constipation.

Uræmia and hydronephrosis may arise from pressure on the ureters. If a myoma become blocked in the pelvis, complete retention of urine, obstruction of bowels, and purulent pelvic peritonitis may come on.

Sterility is frequently associated with myoma.

Diagnosis.—Submucous tumours are easy to diagnose when the cervix is sufficiently open for the finger to pass, or the tumour is already extruded into the vagina. At first the tumour is often felt only during menstruation. A submucous tumour enlarges the uterus in a globular manner. Where, therefore, a symmetrical enlargement of the uterus exists, together with an undilated condition of the os uteri, and pregnancy can be excluded, it is necessary to dilate the cervix in order to directly prove the presence of a tumour.

One recognises small interstitial tumours by their hardness. Often enough the diagnosis is only made of chronic metritis. The treatment is the same. With larger subserous or interstitial tumour the diagnosis of myoma is usually easy, but often the true interpretation of the tumour is difficult. First, one has to differentiate the uterus from the tumour. This is done by combined examination—

including examination from the rectum—as well as by the help of drawing down the uterus with volsella and sounding it.

A tumour sharply defined from the walls of the pelvis, round, of harder consistence than the uterus, and passing by a broad attachment into the latter (which is usually increased in length) is almost certainly a myoma. Yet the diagnosis is very difficult when there is a subserous myoma with a small pedicle. Such can only be differentiated from ovarian tumours by their hardness, and this sign is not always present in myomata, while ovarian tumours may sometimes be solid and hard also. Further, the diagnosis of intraligamentary myomata is difficult. When a circumscribed tumour is recognised, which is situated in the broad ligament, and is only slightly movable together with the uterus, lying close to the latter, the diagnosis wavers between intraligamentary ovarian tumour, tubal tumours, myoma, and, perhaps, hæmatoma of the broad ligament.

In purulent degeneration of a myoma a malignant new growth, carcinoma or sarcoma, is often diagnosed. In the latter, the masses thrown off are small, crumbling, and soft. In myoma it is especially difficult to remove any bits of tissue, but if removed these are more fibrous and firmer than those which are thrown off in sarcoma or cancer. The microscope must be used to resolve any doubt that may remain.

The **prognosis** of myoma is so much the better the more subserous the tumours are, and the slower they are in growing.

Small submucous myomata may be dangerous to life on account of the profuseness of the hæmorrhage which they cause. On the other side, subserous quickly-growing myomata may gradually lead to a fatal termination, through the compression which all large abdominal tumours exercise on intra-abdominal organs—thereby causing grave disturbances of digestion, urine-excretion, and circulation. Medium-sized tumours may, by incarceration in the true

pelvis, cause death. It is necessary also to keep in mind the possibility of malignant sarcomatous degeneration, or of purulent inflammation in any case of myoma. In the larger tumours degeneration of the heart muscle is very apt to come on, and the prognosis of a laparotomy, where this is present, becomes much more serious. An embolus, either before or after an operation, may quickly result in the death of a patient.

The menopause usually leads to a relative recovery, through the cessation of the hæmorrhage. In myoma of the uterus, however, this occurs very late, not, as a rule, until the fiftieth year. On the other hand, there are also cases where a myoma produces symptoms for the first time long after the menopause, such as profuse hæmorrhage.

Treatment.—Where the resorption of a myoma has been described from the effects of a “cure” at one of the “Bads,” or Spas, there has been a diagnostic error through which an inflammatory exudation has been supposed to be a myoma and so treated.

By means of the subcutaneous injection of ergotin in certain cases resorption or diminution or limitation of growth in a myoma has been obtained, and the hæmorrhage has been correspondingly influenced for good. The success of this treatment is, however, very uncertain, and the treatment itself is very wearisome and painful. Schröder noticed the first diminution of a myoma after 400 injections of 0·2 grm. of ergotin. With subserous myomata it is peculiarly impossible to reckon on success.

The same result, namely disappearance, diminution, or at least cessation of growth with stoppage of the abdominal hæmorrhage, is aimed at (after Apostoli and others) by electrolysis with strong currents—up to several hundred milliampères. The author has never seen a disappearance or permanent diminution of a myoma by this method, but has noticed a marked lessening of the hæmorrhage, and often a surprising improvement of the general health. It seems to him that a yet safer way of treating the

metrorrhagia of myoma is by curetting, and the subsequent use of caustics.

With patients, however, who shrink from any operative procedure, the method is a very useful one, and is to be decidedly preferred to the ergotin treatment. The author is restricted from an elaborate description of the carefully perfected method, because a specially constructed and very costly apparatus is necessary for its practice, and naturally the specialist only procures this. Lately, after the use of the fluid extract of *Hydrastis canadensis* given for several months (20 m. three times daily), one has observed a marked diminution of the hæmorrhage.

The operative treatment of myoma may be divided into symptomatic and radical. The former is directed against the chief symptom—hæmorrhage—without any interference with the tumour itself, the latter deals with the removal of the tumour, and with this the removal also of a part or the whole of the uterus.

To the symptomatic treatment belong *curetting*, *electrolysis* and *castration*, to the "radical" the *vaginal extirpation* either of the myoma alone or of the whole myomatous uterus, and also the operation of myomotomy, that is the removal of the myoma by abdominal section, the prognosis of which varies very greatly, whether one can simply ligature the pedicle of a subserous myoma like an ovarian tumour or enucleate it out of the uterine substance, or whether one must open the uterine cavity and remove a part of the uterus together with the tumour. When the whole body of the uterus, together with the myoma, is removed at the region of the internal os, the operation is termed the "*supra-vaginal amputation of the myomatous uterus*." This operation exhibits the highest mortality of all.

In cases where hæmorrhage constitutes the chief symptom, the symptomatic treatment, which aims at the reduction of the bleeding, is first indicated. When the cervix is closed this treatment is commenced by a tamponade of the uterus with iodoform gauze. In this way the cervix

becomes so widely dilated that the surgeon can introduce his finger into the uterine cavity and feel his way as to the length, direction, and relations of the myoma. If the myoma protrudes only very slightly into the uterine cavity the treatment is limited to curetting (see Endometritis).

This carried out by the practised and thoroughly aseptic hand is (practically) without danger. After the curetting, the treatment is concluded by the methodical cauterisation with chloride of zinc, as previously described.

On the other hand, however, if the practitioner feels a submucous myoma within the uterine cavity, curetting and subsequent cauterisation are much less likely to produce a permanent result.

The removal of the tumour is not essentially a more dangerous operation than curetting, provided the tumour is not sloughing, and the practitioner has experience, a thoroughly antiseptic preparation, and a sufficiently rich "instrumentarium" at his disposal. Under these circumstances a myoma up to the size of a child's head may be removed even in virgins and with a closed cervix.

A tumour of 6 cm. ($2\frac{1}{2}$ inches) diameter can be removed from an absolute virgin through a cervix which is dilated only up to the passage of the finger (Chrobak). For this purpose the practitioner seizes the cervix with two volsella, and the myoma with Muzeux's forceps, and draws both uterus and myoma downwards.

If the myoma is not too large, and has a small pedicle, the practitioner can, as a rule, reach the pedicle with his left forefinger, and cut it through with Siebold's scissors. If this is impossible, he endeavours by traction movements to loosen the connections of the tumour, or effects the latter in myomata with broad attachments by dipping his finger into the bed of the tumour, and in this way gradually enucleating it under counter-pressure from outside.

If the Muzeux's forceps tear out, the tumour is laid hold of with strong and broad clamp-forceps. (The author

has proved the Richelot clamp-forceps for vaginal extirpation to be a very good instrument for this purpose.)

If the tumour be too large to be removed in its entirety, it must be lessened by the excision of wedge-shaped portions" ("morcellement").

After removal of the tumour, curetting is done in addition, and the uterus and vagina are washed out with a 3 per cent carbolic solution, or, in marked anæmia, with a 3 per cent salicylic solution or a 1 per cent solution of lysol. The uterus and bed of the tumour is then packed with iodoform gauze.

The treatment just described is yet simpler if the child's-head-sized submucous, interstitial, or cervical myoma be already partly extruded into the vagina. This bays the vagina well forwards, so that occasionally the vaginal part of the mass can be split off and the myoma enucleated (Czerny).

In comparison with laparotomy for these smaller tumours, the vaginal extirpation of a myoma is on the whole a more difficult operation; but if the tumour be removed by the vagina, the patient recovers without the possibility of any later attack of ventral hernia or ileus, as is often the case after abdominal section. The mortality of kolpomyomotomy has already been reduced by Leopold to 3·5 per cent.

We have already pointed out "castration" as a symptomatic method of treatment for myoma.¹ The hæmor-

¹ [On removal of the appendages for myoma:—It does not seem to the translators that the usefulness of this operation is sufficiently appreciated by the author. The operation is by no means contra-indicated in "cases where the ovaries are adherent, or in large tumours, or in tumours with pressure symptoms, or in small tumours more or less incarcerated in the pelvis."

In all cases of myoma in which surgical treatment is advisable (except sub-mucous fibroids which are easily removable from the vagina), this should be the operation chosen, whenever practicable, and only those cases in which removal of the appendages is impossible should be submitted to hysterectomy.

The operation is often a difficult one, and this is perhaps the main reason why it is not more popular; but experience and practice will

rhage ceases after castration, though frequently not until after a long time, or not at all if any parts of the ovaries are left behind.

Very often after castration a shrinking, or even a complete disappearance, of the myoma may occur, and for these cases castration is an operation of similar value to extirpation.

Concerning the extension of this special treatment (which we owe to Hegar) opinions are still very divided.

In the first place, the operation should only be done in interstitial and subserous myomata, when the ovaries are easy to remove and there are no very firm adhesions. Myotomy is to be preferred for tumours which reach above the umbilicus, which cause troublesome pressure symptoms, as well as in smaller tumours which are incarcerated in the pelvis and in subserous myomata with slender pedicles.

When the anæmia is very marked the simplest laparotomy is a very critical procedure. Instead of this, under these circumstances and for interstitial and subserous tumours of not greater size than the foetal head, Leopold has practised vaginal extirpation. This is borne even by very anæmic patients particularly well.

With regard to the *Technique of Castration* generally—and especially in fibromata—the isolation of the ovaries is very important.

This postulate is satisfied either by (the Trendelenberg position) raising the pelvis, or, as Gusserow prefers, by pressing up the ovaries out of the vagina while slightly

surmount most of these difficulties, and very few cases will be found in which the more dangerous operation of hysterectomy is necessary.

In aseptic hands the mortality, after removal of the appendages, should be very low—from 2 to 5 per cent—and when it is successfully accomplished the final result is eminently satisfactory. The patient suffers the usual neurotic symptoms associated with the “change of life,” but when this is over it is extremely rare to find any further trouble from the myoma or its treatment.

Whenever the completed operation is not followed by success there is strong ground for the suspicion that a really malignant growth has been mistaken for a fibroid.—J. W. T.]

turning the tumour, and holding apart the sides of the abdominal incision with retractors.

In this way, if it be not adherent or greatly displaced by the tumour, the ovary either comes into view or can be drawn forwards by two fingers, after the operator has reached the ovary, by following up the Fallopian tube from the fundus uteri outwards.

If it is not immediately easy to tie the whole mes-ovarium with a single ligature, the first ligature is placed in the most accessible part of the tube, and a series of ligatures carried outwards from this through the broad ligament underneath the ovary right up to the infundibulo-pelvic ligament.

The already tied sutures, each one of which contains only a small part of the ligament—the more ligatures so much the less danger from slipping of the ligatures—are held by the assistant, and drawn in such a manner as to make the still unligatured parts below accessible. The ligatures must be tied as tightly as possible. Each succeeding ligature is passed through the middle of the stitched portion of the previous ligature.

In general the surgeon enters his stitch through the anterior layer of the broad ligament, then carries it out through the posterior layer, and after leaving a space of the periphery, re-enters it through the posterior and carries it out through the anterior layer. If the operator do not make use of the special needle of Deschamp, but a sharp needle, the assistant must make the hinder surface of the broad ligament visible by a suitable pull on the already knotted sutures, or the operator must himself guard the point of egress of the needle with his left forefinger, so that the latter may cause no injuries to the bowel. These injuries are quite possible when one cannot succeed in drawing the ovary forwards to the abdominal incision, or when one cannot succeed in pressing the bowels aside either by sponges or by raising the pelvis.

The technique of myomotomy in a subserous myoma with a slender pedicle is the same as that of ovariectomy.

The surgeon turns the tumour out of the incision, he covers the intestines with a flat sponge, and ties the pedicle with a number of ligatures, each of which secures a small part only of the pedicle.

If the tumour be united to the fundus uteri by a broad base, the operator provisionally ties a rubber tube about the broad ligaments and neck of the uterus (after Schröder).

During the application of this the assistant must take care that no bowel-loop becomes included. When the operator has made one knot in the tube, the assistant receives this with catch-forceps before the operator ties the second knot.

The operator now cuts out the myoma by a wedge-shaped incision, and stitches the resulting wound with deep-gripping silk sutures, while superficial silk and catgut sutures bring the peritoneal edges into exact apposition. If the uterine cavity be opened this is closed by a buried catgut suture.

The deep ligatures, as Hofmeier has pointed out, must be passed obliquely in order to securely close the vessels ascending perpendicularly to the wound. In spite of this, further stitches are frequently necessary after removal of the tube in order to stop the bleeding.

Supra-Vaginal Amputation.

If the myoma has developed underneath the layers of the broad ligaments, these are at once stitched together by double ligatures, first on the one side, and then on the other, from the infundibulo-pelvic ligament as far as the region of the internal os uteri. These are then so cut through between the (double) ligatures that the ovary remains with the tumour. In doing this it is better for the surgeon to include only a small part of the ligament in each stitch. The last ligature should include the uterine substance itself, so that in this way the uterus

becomes closed round by stitches, and one may therefore completely dispense with the troublesome application of the constriction-tube.

Thereupon, in case the surgeon wishes to use the latter in spite of what has been said, the tube is placed round the uterus, and about 5 cm. (2 inches) above this, the myoma is cut off.

If it be necessary to undertake the removal of the tumour immediately above the constriction-tube, the surgeon forthwith seizes the sides of the stump with two volsellas, so that it may not retract out of the holdfast of the tube. Now follows the deep cutting-out of the cervical mucous membrane, and the suture of the resulting wound with buried catgut, and deep silk sutures, as already described above.

After removal of the tube and final closure of the still gaping and bleeding raw surfaces, both in stump and ligaments, the threads are cut off short and the stump is dropped (Intra-peritoneal treatment of the stump—Schröder's method).

Hegar, on the other hand, devised the extra-peritoneal method of treatment of the stump which is still in use. This consists in the application of the constriction tube, either without or after the under-stitching of the broad ligaments, the pulling out of the tumour, the stitching of the parietal peritoneum of the lower angle of the wound to the peritoneum of the stump below the tube, the fastening of the stump by two strong lance-shaped needles passed crosswise through the stump above the tube, and the cauterisation of the stump with a 50 per cent solution of chloride of zinc.

For isolated interstitial myomata which are surrounded by thick uterine muscle-structure, one employs the operation of *enucleation of the myoma* with preservation of the body of the uterus (after Spiegelberg and A. Martin).

For this purpose (after the application of the constriction-tube) the thick capsule of the swelling is split, the tumour is shelled out of its bed by the aid of

Muzeux's forceps which are fastened into the tumour, and lastly the wound is stitched. If the uterine cavity be widely opened it is good practice to plug the wound cavity and uterus with iodoform gauze and then sew up the primary incision wound again over this.

The removal of a myoma which has developed within the layers of the broad ligament presents itself to the surgeon in very similar manner. After tying the spermatic vessels the capsule of the tumour is split in a diagonal direction, the sides of the incision secured with volsella, and then the tumour is enucleated. If the uterine attachment is a broad one the neck of the uterus is tied as soon as possible with rubber tubing, and the supra-vaginal amputation carried out. After removal of the tumour a resulting large wound cavity diminishes in size and permits of (easy) suture. Where this is impossible, one stitches the cavity to the lower angle of the abdominal incision or makes an opening from it into the vagina—fills the cavity with iodoform gauze and sews the primary incision together again.

Of late two more operations have been published for myomata, which are both designated by their inventors as the method of the future. The first method, brought forward by A. Martin, consists in the extirpation of the whole myomatous uterus from the abdominal cavity (Freund), in order in this way to remove the cervical stump with its possibly pathological germs. After the removal of the uterus the peritoneal wound is sutured. The author has performed the operation once for a decomposing myoma after suturing the os. The patient, aged seventy, had an irregular pulse of 140 before the operation, and died suddenly after a feverless course on the tenth day from cardiac paralysis.

The second method, which was published by the author, is vaginal cœliomyomectomy (see vaginal cœliotomy). This aims at preservation of the uterus and adnexa as opposed to A. Martin's operation, and consists in the extraction of the uterus through the opened plica vesico-uterina, and consequent removal or enucleation of myomata according

as they are subserous or interstitial or submucous. Naturally this method can only be used for small myomata. The largest of the myomata removed by the author in this way from the opened uterine cavity was about the size of an orange. In several cases the author has removed as many as ten myomata, which in two cases were situated on the posterior wall at the level of the internal os. The wounds thus caused are sutured with interrupted catgut stitches, and with the exception of those on the posterior uterine wall, may be rendered extra-peritoneal by subsequent vaginal fixation. The patient may be discharged as early as the ninth or tenth day. The operation is not more dangerous than curetting. Hence extirpation of myomata according to the method described, is justified as soon as a diagnosis has been made, just as in former times small submucous myomata were removed through the cervix as soon as they were diagnosed because the operation was considered devoid of danger.

As soon as the general practitioner learns that there is a safe method of extirpating small myomata, through the vagina, wherever they are, myomata will gradually come into the hand of the specialist while they are still small and admit of removal by vaginal cœlio-myomectomy. In this way the necessity for the other operations, described above, and for mutilating operations, becomes continually less, and it will be with myomata as with ovarian tumours, which were operated upon only when they had reached a large size, but nowadays are removed by laparotomy as soon as they are diagnosed, because of the lessened danger.

Concerning the choice of the various operative procedures for myoma, the following may be said:

1. Smaller myomata should be removed with every care (as soon as diagnosed), *per vaginam* by vaginal cœlio-myomectomy,¹ or isolated submucous myomata

¹ The author begs to recall once more that he understands cœliotomy to be the opening of the peritoneal cavity, and that he differentiates ventral and vaginal cœliotomy.

may be removed through a dilated cervix (kolpomyotomy).

2. With larger myomata and when vaginal cœliomyomectomy is impossible, and when there is no necessity for the patient, owing to her social status, to be radically and quickly cured, the hæmorrhages may be stopped by curetting followed by caustics.

3. Colossal tumours which completely fill the abdomen or smaller but incarcerated myomata, or myomata which are growing rapidly or causing severe pain or breaking down, must be removed by ventral cœliomyotomy. With putrid myomata, Martin's total extirpation or the extra-peritoneal method is to be preferred, in which whenever possible the operator first shuts off the myoma from the peritoneal cavity and then amputates it.

4. Hæmorrhage also may offer an indication for myomectomy in cases where this symptom cannot be stopped by curetting, etc. Under these circumstances, the vaginal conservative method is suitable for small myomata and total extirpation, ventral cœliotomy and castration for larger myomata.

In the consideration of these indications, the circumstance must be remembered that vaginal extirpation of myoma and curetting, under thorough antiseptic and careful precautions, are nearly absolutely without danger, while the mortality of castration is about 8 per cent, total extirpation 10 per cent, and myomectomy with supra-vaginal amputation (both in the intra- and extra-peritoneal methods of stump treatment) bears a mortality of about 22 per cent.

The Malignant New Growths of the Uterus.

Carcinoma.

1. *Carcinoma of the neck of the Uterus.*

According to Ruge and Veit this can develop on the outer surface of the portio vaginalis—superficial cancrioid of the portio vaginalis; or on the cervical mucous membrane—cancer of the cervical mucous membrane; or lastly may grow in the parenchyma of the cervix itself—cancer of the cervix.

The first form seldom passes over to the cervical mucous membrane, but plants itself on the vagina and the para-cervical connective tissue. The second spreads itself with a predilection upwards to the mucous membrane of the body of the uterus, while in the third form the cancerous lumps break out sometimes on the outer surface of the portio and sometimes within the cervical canal. In the later stages it is impossible to tell which of the three forms had originally existed. From a therapeutic point of view these distinctions are not of so much importance in the present day as formerly, since the surgeon undertakes at present the removal of the entire womb for all three forms of the disease.

Of all women who die of cancer, the third part suffer from uterine cancer (Schröder). The disease most frequently occurs about the "climacteric"—between the ages of forty and fifty. The formation of metastatic growths is rare.



FIG. 109.—Cancroid of the vaginal portion of the cervix with destruction of the posterior vaginal fornix (After Gusserow).

Symptoms.—So long as the new growth is not ulcerated, so long as no cancer-wound is present, carcinoma gives rise to no symptom. The earliest symptom of the onset of ulceration is hæmorrhage. At first this is small in amount, comes on only on definite extra occasions, and most frequently during connection. Later on it increases the menstrual flow, and when this ceases a sanious watery discharge is left behind. In other cases a smart irregular hæmorrhage comes on all at once. Women who have passed the change of life (may) consider this as a return of their periods. When the ulceration has progressed further the discharge which was not specially foul at the beginning of the disease becomes more prominent, it becomes putrid, stinking, and brownish discoloured, and contains broken pieces of blackish tissue.

The pain—as Gusserow has specially pointed out—is throughout no constant symptom of cervical carcinoma. This comes on first when the disease has extended to the body of the uterus or the pelvic connective tissue, and also when the disease reaches the neighbourhood of the peritoneum and causes peritonitis. Pruritus vulvæ, mastodynia, and disturbances of digestion occur, now and again, as associated symptoms.

Further symptoms belong to the spreading of the cancer. Extension to the bladder may give rise to acute cystitis and to vesico-vaginal fistula. Recto-vaginal fistulæ are met with much less frequently. If the cancer-mass should involve the ureters, hydro-nephrosis and uræmia may arise. Pressure on the iliac veins may produce thrombosis and œdematus swelling of one or both legs. Distaste for food and vomiting is sometimes the consequence of chronic gastric catarrh, sometimes is caused by the foul atmosphere in which the patient has to live, and sometimes is the result of chronic uræmia.

“The sequence of discharge, hæmorrhage, vomiting, and loss of appetite now very soon causes marked marasmus, in which the anæmia and hydræmia take part. (Edema arises, discoloured anæmic skin—in short, all

those symptoms, easy to recognise but not so easy to describe, which unite together to form the picture of 'cancerous cachexia.' These, and the expression of deep suffering become especially intensified when ceaseless pain, both by day and night, allows no rest to the tormented frame" (Gusserow).

In this way the patient gradually dies either from marasmus, uræmia, or peritonitis, and usually in from 1 to 2½ years from the onset of the first symptom.

Diagnosis.—Notwithstanding that the diagnosis of cancer of the cervix is usually so very easy, it is, as a rule, first made so late in the progress of the disease that the patient reaps no special advantage from it, because the full removal of the cancerous vegetation is in the later stages impossible. This depends on the unhappy opinion, fostered also by many physicians, that profuse bleedings about the "climacteric" are of no importance.

Women suffering from such symptoms, if they go early to a physician, are simply given hydrastis or ergot, and when, finally, a digital or speculum examination is undertaken, the disease has already extended too far for a radical cure to be possible. Or the cancrroid of the portio is supposed to be an erosion, and thereupon is treated so long with caustic, until in this case also it is too late for total extirpation.

The early diagnosis of carcinoma is for this reason held of the highest importance, because uterine cancer is in the beginning a strictly local affection which, by early removal of the diseased organ, the uterus, can be permanently cured.

Every woman who, after the cessation of menstruation, has again commenced to bleed, should be considered as carcinomatous until the surgeon has investigated the case and found no sort of sign of carcinoma.

Such a patient must be examined at once before introducing any kind of medication, and if there be nothing suspicious to notice in the portio vaginalis, the uterus should be curetted thoroughly from the fundus to the external os uteri. Precisely in the same way must the

surgeon examine younger patients who complain of meno- or metrorrhagia. The necessity for this is still more urgent if the above described discharge be also present.

The diagnosis of cervical cancer is easy as soon as it is ulcerated—and it is very rarely that one sees carcinoma earlier. Quite characteristic then is the definition between the ulceration and the new growth, the bleeding on touch and the crumbling off of the soft marrow-like masses. In cancrroid of the portio, the latter is often lost in the luxuriant vegetations—cauliflower-growth of the portio—while, in carcinoma of the cervix, the finger behind the intact external os enters a crater-like cavity, the walls of which are already no longer formed from the uterus but from the pelvic connective tissue.

Even in the diagnosis of the more certain cases, microscopical examination must be carried out without exception, in order to weaken the possible objection, if the patient permanently recovers, that the disease concerned could not have been a carcinoma—an objection which is specially urged by Englishmen against the German statistics.

Early carcinoma occurs on the portio first as an erosion. According to Gusserow it is differentiated from a benignant or simple erosion by the sharp, prominent, clearly raised and somewhat infiltrated margins—and from the fact that the erosion lies under the niveau of the portio, and that it is soft, so that an inserted volsella easily tears out.

Early carcinoma of the cervical mucous membrane easily bleeds, but often cannot be distinguished microscopically from old cervical catarrh. In these early carcinomata of the mucous membrane and cervix it is necessary, for any certainty of diagnosis (according to the foregoing researches of Ruge and Veit), to excise a wedge-shaped portion of the suspicious mucous membrane and subjacent tissue as well as any suspicious nodes in the cervix itself, to harden these, and cut them into

sections, going perpendicularly from the surface downwards, and to examine these with the microscope.

In carcinoma one may then discover epithelial "nests" full of epithelial cells, with small-celled infiltration of the surrounding tissue. The microscopical examination will also establish with certainty the differential diagnosis of the foregoing from a putrefying myoma.

Prognosis.—Carcinoma of the uterus is an absolutely lethal disease if it be not removed early enough by operation. If operated on quite early, before the disease has advanced beyond the uterus, a permanent cure can result. Indeed a return of the disease after early operation teaches us that in many cases where one fancied that the cancer was still confined to the uterus, it had really already spread into the parametrium.

Treatment.—This consists in the removal of the carcinomatous uterus so long as this is still possible. Vaginal total extirpation of the uterus may be done so long as the portio can be pulled down into the vulva with a volsella. In such cases, if suspicious bead-like thickenings can be felt in either the broad or sacro-uterine ligaments, the operation is still justifiable in order to spare the patient the later putrid ulceration.

Unfortunately the cases submitted to operation constitute only a small fraction of the cases of cancer of the uterus in general. The fault of this lies partly on the omission of local examination and partly on the still widespread opinion, even among physicians, that uterine cancer is incurable. How false this idea is, one learns (for example), by a case of total extirpation for uterine cancer which was operated upon seven years ago by Dr. von Gusserow, and still remains well.

Technique of Vaginal Total Extirpation.—To the usual preparations for disinfection in putrid carcinomata is added the removal of the putrid part. This is effected most certainly, previous to the total extirpation, by the removal of the carcinomatous vegetations with a knife, or in carcinoma of the mucous membrane, by curetting.

After thorough washing and rubbing down of the resulting wound-surfaces by a 5 per cent carbolic solution or a 1 per cent solution of lysol, these are sewn together, whereby the hæmorrhage is stopped and the exit of any loose carcinomatous masses out of the os uteri is prevented. When this preliminary to operation is over, the necessary instruments and utensils—such as irrigation-tube, mackintosh sheeting, etc., are changed for others, and the operator and his assistants also must again disinfect themselves.

This small loss of time of three minutes (for disinfection after Fürbinger's method, and disinfection by lysol) is of no importance compared with the greater security ensured to the opened peritoneal cavity against septic infection from decomposing masses of cancer or reinoculation.

Viewed from this preliminary, the operation is so ordered that a catheter is introduced into the bladder, the portio is drawn down with two volsellas, and two side-retractors are inserted into the vagina. After drawing the uterus strongly to the left side, the operator passes, with Deschamp's needle, a strong silk thread quite deeply through the right vaginal vault. This is immediately tied as firmly as possible. After drawing the uterus to the right, the left vaginal vault is attended to in the same way.

The bleeding from the circumferential incision around the portio is lessened by these control stitches, and above all, from both of these threads, which the assistant draws strongly downwards, the operator obtains a very convenient handle by means of which the operation-field can be made more accessible. The operator now cuts round the anterior surface of the portio between the two threads, and opens up and sutures the plica vesico-uterina as described in vaginal cœliotomy. This is easily done if the plica be pulled down with the finger, and not pushed up from the uterus and bladder as is often done. If the plica is not easily opened up, the operator leaves this, lets the

portio be drawn strongly upwards by one of the assistants, and introducing the posterior blade of a Simon's speculum—which, together with the right retractor, are best held by a nurse sitting behind the right assistant—he cuts around the posterior surface of the portio.

This incision sometimes falls directly into the pouch of Douglas, otherwise the operator fetches the bottom of the wound near the uterus forwards with a hook forceps, and incises the base of the cone thus formed with a pair of Cowper's scissors. Into the peritoneal cavity thus opened the operator introduces his left forefinger; with this he draws the posterior layer of peritoneum forwards, and sews this to the vaginal wound margin with a few interrupted sutures carried from before backwards. In this way any hæmorrhage from the retro-cervical connective tissue is stopped. Now follows the ligation of the lowest parts of the broad ligaments.

To this end the right assistant forcibly draws to the right side the ends of the right control-suture, the left assistant drawing the cervix strongly to the left, while the operator lays his left forefinger against the posterior surface of the right broad ligament, and from the previously opened anterior vaginal vault passes a Deschamp's needle, armed with a strong silk suture, around the base of the right ligament. This is immediately tied as strongly as possible and given over to the right assistant. A second and even a third suture passed in the same manner secures still higher portions of the ligament, whereupon the operator cuts through the tissue between the sutures and the uterus with a pair of Cowper's scissors. If the stump of the ligature bleeds, the operator forthwith passes a further suture, which is best applied a little above the ligature stump in the yet unligatured part of the ligament, and then tied outside the already passed ligatures. (To this end the left assistant must draw over the threads to the left.) The neck of the uterus must be freed on the left side in exactly the same way. Now the anterior pocket of peritoneum close to

the uterus is usually drawn forwards lightly with hook forceps, and opened with Cowper's scissors. The anterior layer of peritoneum is then united with the anterior vaginal wound margin in the same way as has been already described at the opening of Douglas's pouch.

While the portio is thoroughly drawn downwards, the broad ligaments are then ligatured upwards *in situ*, going steadily on until the operator with his finger reaches the upper border of the ligament.

He now fixes the yet remaining part of the ligament with a sharp needle to the lateral vaginal wound margin, whereby the stump of the ligament becomes closely folded together. If the operator can conveniently apply these last ligatures outside the tube and ovary he does so, and then on the inside of his sutures cuts through the rest of the ligament. On the other side the ligature of the broad ligament and separation of the uterus is quickly finished in the same manner.

The bleeding, which from the first cut generally ceases as soon as the base of the broad ligament on both sides has been tied, should now absolutely stop. In order that no hæmorrhage should arise on separation of the broad ligaments, it is necessary to ligature a small part only each time, and to tie each ligature very firmly. In this way the operation may be made almost a "bloodless" one.

After removal of the uterus the stump sutures, as well as the anterior and posterior thread-bundles, are separated from each other, and each thread-bundle is then tied round with another thread close to the knots. All threads are then cut short close up to these circular ligatures. A strip of iodoform gauze is placed in the lower part of the abdominal cavity and in the vagina.

Many authors, and Kaltenbach especially, recommend the suture of the peritoneal opening.

The after-treatment is mostly expectant. The catheter is used only when the patient cannot spontaneously pass her water.

The iodoform gauze is removed after a few days, the stitches after 14 days.

In place of ligatures, Richelot and Landau have employed clamping of the broad ligaments with forceps, which are allowed to remain for from 36 to 48 hours. The author has operated many times after this method with success, but is of the opinion that its advantages do not outweigh its manifest disadvantages, and he only uses the clamp when the ligatures cut through or slip off the tightly stretched ligament.

Difficulties may arise in total extirpation. The vagina may be senile and contracted, or the uterus may be excessively large. In the former case the uterus can be made accessible very conveniently through a perineo-vaginal incision, as the author can testify from his own experience. In the latter case, where it is difficult to deliver the almost fully liberated uterus through the opening in the vaginal vault, the operator has to notch the anterior and posterior wound-margins with sagittal incisions. In one apposite case the author could not remove the uterus until one of the incisions had torn widely, as far as the posterior commissure.

A quite big uterus may be delivered easily, as P. Müller points out, if it is partially or completely split from below upwards. This manœuvre cannot be practised when a foul cancer of the body of the uterus is present.

If the uterus be so large that its delivery from its surroundings "*per vaginam*" appears to be impossible, then total extirpation by laparotomy (Freund's operation) comes into consideration.

This method has been recently modified so that the releasing of the uterus from its attachments is carried out partly from the vagina and partly from the abdomen.

The operation is commenced just as in vaginal total extirpation. When the uterus can be drawn down no further, and no higher ligatures can be applied, the operator plugs the wound and vagina with iodoform gauze, opens the abdomen, ligatures the upper part of the broad

ligaments, and finally cuts through the anterior and posterior peritoneal pockets that were filled with gauze.

The mortality of total extirpation is steadily decreasing from 32 per cent to 10 or even $5\frac{1}{2}$ per cent (Leopold), and 3 per cent (Kaltenbach).

In thirteen vaginal total extirpations the author lost only one case (on the 15th day after operation, and after a completely afebrile course) from embolism, which was produced on getting up (7·7 per cent mortality).

On account of this small mortality, the operation highly extolled by Von Schröder—viz. the removal of the cervix after opening the vaginal vault—has apparently been universally abandoned in favour of total extirpation. Returns of the disease are indeed frequent, and may occur many years after the operation; as a rule patients come too late for the operation.

Of injuries to neighbouring organs, vesico-vaginal fistulæ are specially frequent; now and then one meets with a uretero-vaginal fistula.

SYMPTOMATIC TREATMENT.

If the carcinoma be inoperable, we must seek to combat the (accompanying) putridity, hæmorrhage, and pain. The first two symptoms are often relieved for a long time by a thorough curetting or removal of the cancerous masses with the knife, followed by cauterisation with Paquelin. If the hæmorrhage does not cease after this, and after douching with ice-water, the bleeding parts should be ligatured. According to the advice of Fritsch, the gaping wound cavity may be filled with iodoform and tannin gauze. This needs to be changed only once or twice during the week. Latterly, again, the chloride of zinc caustic, which has been so strongly recommended, has also given us good results.

A small bag of gauze is filled with a paste of 4 parts of chloride of zinc, 3 parts of wheat-flour, and 1 part of oxide of zinc, and is introduced into the wound cavity,

after complete scraping off of the cleaned surfaces. This is allowed to remain *in situ* for six hours. The vagina is protected from corrosion by wool-tampons, which have been smeared with oil or vaseline.

For the relief of pain, morphia in various forms must be administered.

If the patient cannot have direct local treatment, she must use injections herself. The 1 per cent solution of lysol is best for this purpose, as by its disinfecting power it covers the foul smell of the discharges.

2. Carcinoma of the Body of the Uterus.

This appears sometimes in the form of large nodules, which invade the whole wall of the uterus, sometimes as an infiltrating enlargement or in the form of polypoid vegetations of the mucous membrane (Fig. 110).

The disease occurs most frequently between the fiftieth and sixtieth year. It is certainly less common than cancer of the cervix.

The symptoms consist in hæmor-

rhages, profuse watery discharge, and pain, as soon as the deeper layers of the uterine muscle are affected.

The diagnosis of a malignant new growth may be made almost with certainty when, after complete cessation of menstruation for upwards of a year, the foregoing symptoms appear. On examination, the surgeon finds the uterus enlarged; with the finger or sound he recognises

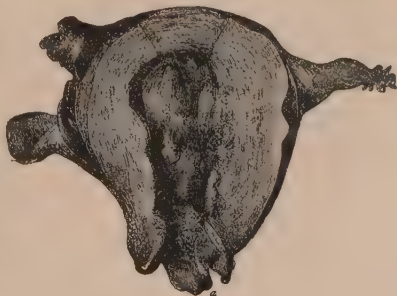


FIG. 110.—Carcinoma of the body of the uterus. Total extirpation of the uterus (combined method). Recovery. (After Gusserow.)

the vegetations, and the curette extracts crumbling masses which, on microscopical examination, show the structure of carcinoma or of malignant adenoma. The latter has the extraordinary characteristic that the glands develop very tortuous canals, the beginning and ending of which it is scarcely possible to recognise. The connective tissue quickly disappears. Occasionally the glands show commencing cancer formation (C. Ruge).

The treatment has been already described under cancer of the cervix. Returns of the disease are less frequent in this form.

Of five cases operated on by the author, two of which are of nearly three years', and the last of eight months' standing, all remain free from return at the present time.

Sarcoma of the Uterus.

According to Gusserow, two forms of this disease are to be differentiated, the one "fibro-sarcoma," arising from the parenchyma of the uterus (Fig. 111); the other, "diffuse sarcoma," springing from the mucous membrane (Fig. 112). Uterine sarcomata are much rarer than the carcinomata, and only very seldom start from the cervix. Fibro-sarcoma arises from sarcomatous degeneration of a fibroma. In both forms are sometimes found signs of transition towards the carcinomata—carcino-sarcoma. They occur most frequently about the time of the climacteric.

The symptoms of a fibro-sarcoma are at first those of a fibroma. A swelling of this kind which first arises at the menopause, or grows unusually quickly, or soon returns after removal (recurrent fibroid), is always suspicious of sarcoma. The symptoms of diffuse sarcoma are also present, namely, hæmorrhage, pain, and sero-sanguineous discharge. If, as frequently happens, the cervical canal be open, the finger may feel directly the sarcomatous nodules, which crumble on touch, or the soft brain-like masses of diffuse sarcoma. Microscopical examination

will in such cases then establish the clinical diagnosis. If the sarcomatous disease is only beginning, and glands are present in the microscopical field, the differential diagnosis between this disease and interstitial endometritis as given by C. Ruge may be difficult.

In such cases Gusserow follows the well-grounded practice of thoroughly curetting the uterus. Then, either



FIG. 111.—Fibro-sarcoma of the uterus with nodules in the vagina. (After Gusserow.)



FIG. 112.—Sarcoma of the uterine mucous membrane. (After Gusserow—Wyder.)

large masses are obtained concerning the structure of which the microscopical examination affords clear evidence, or if only a little is removed, sufficient clinical observation of the course of the disease for a shorter or a longer period brings certainty as to its nature, and usually in the sense that the case is one of simple endometritis. Since the sarcoma causes rapidly-growing vegetation, dilatation of the uterus and digital examina-

tion of its interior is to be recommended for these rare and doubtful cases.

The **treatment** consists in the extirpation of the diseased uterus, if possible "per vaginam." As the bleeding in sarcoma occurs earlier than in cancer of the cervix, the patient sometimes comes early to the surgeon, and therefore with less extensive disease, and consequently the prognosis in relation to the permanency of cure after operation is better in these cases than in cancer of the cervix. Should metastases be already present, the same symptomatic treatment is indicated as was advised for carcinoma.

DISEASES OF THE OVARIES.

HÆMORRHAGES IN THE OVARIES.

These mostly affect the follicles and but seldom the interstitial tissues. Small hæmorrhages are common into the follicles, and ovulation and the formation of a typical corpus luteum is replaced by blood extravasation into a perhaps immature and non-rupturing follicle—atypical corpus luteum (Leopold). At times large extravasations take place when injurious causes act during menstruation. The author removed an extravasation of this kind the size of a fist by laparotomy.

The differential diagnosis from ovarian tumour is difficult when the swelling is large, because the signs are the same. The sudden onset of pain and pressure symptoms in the pelvis point to hæmorrhage, especially, if shortly before, one has found the ovary normal.

The treatment is antiphlogistic, and afterwards absorptive. If resolution tarries and the distress is great, then vaginal laparotomy and igni-puncture, or removal of the diseased ovary, is indicated.

Interstitial hæmorrhages occur, as in other parts of the body, in severe infectious diseases, and have no importance compared with the original disease.

INFLAMMATION OF THE OVARIES (OOPHORITIS).

1. Acute Oophoritis.

This is subdivided into parenchymatous and interstitial. The first takes place in acute infectious diseases and

implicates the follicles, producing cloudy swelling and subsequent disintegration, the second is an inflammation of the connective tissue of the ovary which passes into chronic oophoritis or suppuration. It arises from infection, which is generally of a septic or gonorrhœal nature.

The **symptoms** which accompany both forms are, as a rule, very slight in character considering the gravity of the disease, it is only in rare cases that the pus is confined to the tubes and ovaries (pyo-salpinx, ovarian abscess), as a rule, it passes to the peritoneum and then leads to perimetritis or peritonitis. If the latter continues parenchymatous oophoritis may lead to amenorrhœa and sterility by destruction of the follicular structures. Interstitial oophoritis which goes on to abscess formation without the patient succumbing to the accompanying peritonitis, exhibits symptoms of severe perimetritis. After the patient has got over the acute sepsis, severe pains in the pelvis, occasional febrile changes, and very distressing and prostrating general weakness are still left behind. The examination without anæsthesia is readily mistaken by the beginner for a simple exudation, but the expert, even without anæsthesia, can generally make out correctly a tumour of the adnexa, which is intimately united to the uterus, but can be limited above and from the pelvic walls. In such a case one could only diagnose pyo-salpinx with certainty, since an ovarian abscess is never larger than a hen's egg, and the ovary can reach this size with pyo-salpinx simply through chronic oophoritis. The diagnosis may be difficult, when, together with a tumour of the adnexa, there is a perimetritic exudation. In the latter case one feels the posterior vaginal wall pushed down and forwards below the tumour. After opening the perimetritic abscess one can feel through the abscess cavity, and from outside, the tumour of the adnexa lying higher. When a suppurating ovarian cyst is present the tumour is round, large, and the tube cannot be palpated.

The **treatment** of ovarian abscess consists in laparotomy. Any purulent, perimetritic exudations should be

opened a few days before per vaginam. In the laparotomy one can often leave a bit of the ovary behind, at least on the other side, and even when the two tubes are diseased and are removed, the patient may still menstruate. This is of great value, since the artificially brought on climacteric is often very depressing to the patient, and indeed may cause insanity. By retaining a bit of the ovary, senile shrinking of the genitals is hindered. The patient remains physically and psychically a woman.

2. Chronic Oophoritis.

This may arise, as already mentioned, from acute oophoritis. More commonly it is chronic from the first and arises in connection with endometritis, endosalpingitis, perimetritis, or from traumatism to the ovaries lying in Douglas's pouch, with retroflexion of the uterus. Chronic oophoritis is often found with myoma of the uterus.

Chronic oophoritis is characterised macroscopically by enlargement of the ovary. This may reach the size of a hen's egg. The surface is uneven from projecting and enlarged follicles. It is the enlarged follicles which cause the increase in size—small cystic degeneration of the ovary of Hegar. The ovary is studded all over with cysts varying from a pea to a hen's egg in size. They mostly contain clear fluid but sometimes blood. *Microscopically* Bulius says that in these cysts there is found granular degeneration of the epithelium, the ovulum is degenerated and nowhere to be seen. The connective tissue is indurated, the vessel walls thickened, and, according to Winternitz, their intima has often undergone hyaline degeneration.

The chief symptom of chronic oophoritis consists in continuous severe pain in the hypogastrium. This pain increases remarkably if, as commonly happens, the ovary prolapses from its weight into Douglas's pouch. The ovary is apt to become fixed by adhesions, and to suffer direct irritation both in defæcation and cohabitation.

The pains are worse before the onset of menstruation,

which is often irregular and profuse (ovarian dysmenorrhœa). Their influence for harm on the general health is very marked, so that gradually typical hysteria develops.

Diagnosis can only be said to be established when it has been possible to get the enlarged ovary between the fingers of the two hands in bi-manual examination, and to estimate its acute tenderness. The pain on pressure is greater than in any other gynæcological condition—the patient shouting loudly and writhing with pain when the ovary is disturbed. As a rule, an ovary so affected is also adherent. If the perimetritic exudation layers are very thick, the ovaries cannot usually be distinguished.

Treatment is directed in the first place against the causes of chronic oophoritis. Any endometritis present should be cured. Perimetritic adhesions round the ovaries are treated actively, unless they are complicated by collections of pus in the Fallopian tubes (pyo-salpinx). In the latter case, abdominal section for removal of the diseased uterine appendages is indicated (see below). In the first case Thure Brandt's method of treatment by massage is decidedly the best. Painful perimetritic adhesions are rendered painless by gentle circular massage—by this means the tenderness of the ovary itself is removed—and then these are gradually separated from the ovary, either being peeled off or so stretched that the ovaries regain their normal mobility. In many cases by freeing the ovaries under anæsthesia (B. S. Schultze), the treatment by massage is much shortened. If the ovaries of chronic oophoritis are freely movable, massage is of less value. The author has had very happy results from energetic ichthyol treatment as recommended first by Freund jun. The author orders four ichthyol¹ pills per diem of 0·1 gramme ($1\frac{1}{2}$ grains), and an ointment of ichthyol lanolin and vaseline in equal parts (to

¹ In all painful conditions of the ovary the translators can thoroughly recommend the use of *viburnum prunifolium*; 15 minims of the liquid extract may be given three times a day. Of all drugs supposed to have any influence on chronic oophoritis this seems to be the most reliable.—J. W. T.

be rubbed into the hypogastric region morning and night), and passes daily or every other day a plug soaked in 20 per cent ichthyol glycerine into the posterior fornix. With this treatment the author has often seen quick diminution and complete disappearance of the pain and tenderness on pressure of the ovary. In many cases a marked diminution in size of the ovary took place, but often the old complaint returned again after months. At any rate the author considers the ichthyol treatment to be more practical than hot douches, wet packs, warm hip and body baths, painting with iodine, and electricity, agents which are often used against chronic oophoritis. If the treatment by this method has had no success, or the complaint recurs frequently, extirpation of the diseased appendages may be advised when the patient is sick of further symptomatic cures, and her employment and means are severely hampered.

For this purpose up to now laparotomy was performed, but many new troubles were thus raised (p. 52). The author has in the last years carried out vaginal instead of ventral laparotomy, in many cases for the extirpation of a diseased ovary. The other less diseased ovary was igni-punctured—that is, the visible cysts were opened with Paquelin's cautery. The results were very good, the ovary left behind diminishing in a striking manner. Perhaps we may limit ourselves to vaginal igni-puncture, and thus save both ovaries even with rather severe small cystic degeneration.

Batley, who with Hegar introduced "castration of the female," removed the ovaries through the pouch of Douglas in his earlier cases. This way is inadvisable, and is better avoided. The extirpation of the ovaries is often not to be accomplished in this way, and posterior perimetritic adhesions arise through the opening up of the pouch of Douglas, which may cause great distress. There has been much abuse of true castration, in the last two years, by the removal of sound ovaries. This is indicated only in the following cases :

1. For certain malformations of the genital organs (p. 90).
2. For myomata (p. 178).
3. For osteomalacia.

According to Fehling castration in osteomalacia induces cure of the bone disease. This should only be performed when treatment with phosphorus has proved of no avail. The latter can in some cases cure osteomalacia, and the treatment consists in the administration for months of a teaspoonful daily of 0·03 of phosphorus to 100 parts of cod liver oil.

THE NEW GROWTHS OF THE OVARIES.

Cystic New Growths.

1. Hydrops folliculi is an enlargement of the ovaries, which arises from the formation of much fluid within numerous but normal follicles which do not burst. Bursting is prevented by the perimetritic exudation layers which cover the ovary.

2. All large unilocular cysts of the ovary, which contain no epithelium, are described after Nagel as cysts of the corpus luteum.

3. The cystomata are, according to Waldeyer, true new growths from the germinal epithelium. Nagel has found that offshoots and ingrowths of the germinal epithelium are caused by chronic oophoritis, and views these with Gusserow as the first stages of cystomata. Closely placed cysts (cystoma proliferum glandulare—Waldeyer), arise from epithelial sprouts which spread downwards, soften in the middle, and continually send out new branches.

These cysts are all lined with epithelium, and have thin fluid, or in many cases tough jelly-like contents, of whitish or darkish tinge, which does not coagulate. By the continuous growth of these swellings, tumours of 50 kilos (110 lbs.) and over may arise. By rupture of the interstitial walls at a later stage, the greater number of the cysts fuse into one main cyst. Cysts often burst into

the peritoneum, and in this way with increased passage of urine there may follow a temporary diminution of the swelling, but this accident is apt to cause marked peritoneal irritation (pseudo-myxoma peritonei—Werth), or even true peritonitis. If the connective tissue of the wall gets thick and unyielding, then papillæ bearing epithelium may be formed on the inner surface of the cyst (cystoma proliferum papillare—Waldeyer). These papillæ often contain psammomatous bodies, they quickly break through the cyst walls, and produce metastases on the peritoneum as well as ascites. From this point they are malignant. They reach no large size, and are characterised by their double-sided position and intra-ligamentary growth (Ols-

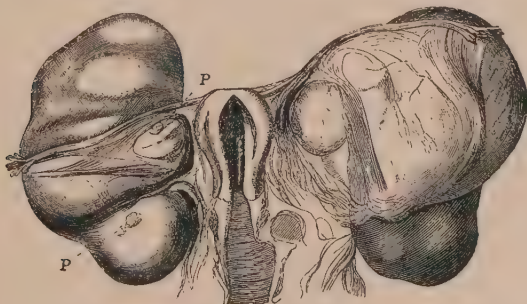


FIG. 113.—Double-sided intra-ligamentary tumour. PP=papillæ, breaking through the outer wall. (After Olshausen.)

hausen, Fig. 113). Dermoid cysts of the ovary grow to a man's head in size. The fixed ovarian cysts in children or young people are mostly dermoids. They often perforate into the bladder and the rectum.

Mixed swellings of these three forms occur as well as malignant degeneration of ovarian tumours. Both of the Freunds and Fritsch have discovered fixed laws for the direction of growth of ovarian tumours. According to W. A. Freund, an ovarian tumour grows between the layers of the broad ligament and becomes intra-ligamentary if the ovary lay originally with its base between the

layers of the ligament—and according to Fritsch and H. W. Freund, a pedunculated ovarian tumour first falls into the pouch of Douglas from gravity, but as soon as the tumour, as a result of its size, rises out of the pelvis, it falls forwards owing to gravity again. The structures forming the pedicle—Ligamentum ovarii, tube, and broad ligament—as well as the uterus come to lie in this way behind the tumour. According to H. W. Freund, twisting of the pedicle arises from this change of position. This, when very marked,¹ leads to noticeable bleeding into the cyst, to severe symptoms of peritonitis, and indirectly also to decomposition of the tumour. The latter is caused by unclean tapping, or according to Olshausen, by the constantly formed bowel adhesions which exist in high degrees of pedicle torsion. As a result of these adhesions ileus may occur in cases of pedicle twisting. If the patient gets over the twisting of the pedicle, and no very large vessels are formed in the adhesions, a shrinking of the tumour ensues, and therewith a kind of spontaneous cure. The original pedicle may be entirely twisted off. Adhesions to the bowels arise only as a result of severe peritonitis in connection with the torsion of the pedicle or rupture, but adhesions to the anterior abdominal wall, and to the omentum, take place with every large tumour without symptoms as a consequence of the loss of surface epithelium from mechanical abrasion.

Symptoms.—Small tumours which lie in Douglas's pouch often cause severe urinary disorders and obstruction of the bowel. These troubles disappear just as in pregnancy when the tumour rises out of the pelvis. If the small tumours are fixed, the symptoms of perimetritis become prominent. Profuse menstruation occurs especially in intra-ligamentary tumours, as a symptom of engorgement. Amenorrhœa, when pregnancy is excluded,

¹ Marked twisting of the pedicle with numerous turns occurs from the peristaltic action of the bowels, according to Olshausen and Küstner. [It is attributed to the phases of distension of the large intestine, the sigmoid flexure especially, hence the rotation is from left to right, and is commoner on the left side].

occurs in very debilitated patients, or when double-sided or malignant tumours are present. When the tumour passes the size of a pregnant uterus it causes pressure on the stomach and bowels, from which nutrition suffers. Upward pressure on the lungs leads to difficulties in breathing. These disturbances of digestion, respiration, and circulation can gradually lead to death by causing marasmus, and this usually in about three years from the onset of the first symptom (Olshausen). In other cases death follows as the result of peritonitis (caused by rupture or twisting of the pedicle), or by malignant

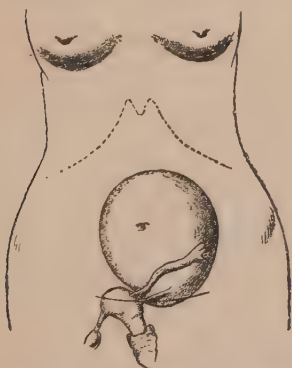


FIG. 114.—Pediculated Ovarian Cyst, as drawn from the condition found on examination, verified by laparotomy (Dührssen).

degeneration of the swelling, or by suppuration of the cyst, or as a result of ileus brought on by twisting of the pedicle.

Diagnosis.—An ovarian tumour is usually a round movable swelling which is united with the uterus by a larger or shorter peduncle (Fig. 114). It is necessary to establish two points for the diagnosis: first, that one has

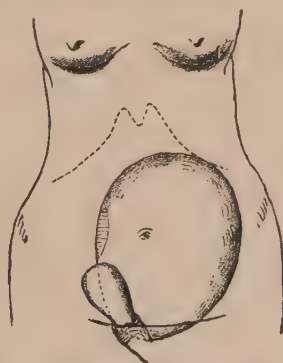


FIG. 115.—Intra-ligamentary Ovarian Cyst.

The correct diagnosis was made by the author before operation on the ground that the uterus was not enlarged. Ligature of the uterine cornu, enucleation after tying of large vascular bands, resection of the remaining portions of the cyst, stitching the sac to the abdominal incision, and tamponading with iodoform gauze. Recovery

to do with a circumscribed and not a simple diffuse swelling; and secondly, that this swelling is united to the uterine cornu by a peduncle. The free movement of a small ovarian tumour independently of the uterus is often best gauged by the fact that such a tumour lying behind the uterus can be pushed upwards into the false pelvis, the presence of a pedicle is proved in difficult cases by drawing down the uterus with volsella after Hegar's method, and then examining per rectum the lateral angles of the uterus up to the fundus, or, after B. S. Schultze's method, an assistant pushes the tumour as high as possible from outside during examination. The combination of these two methods is often advisable.

The diagnosis is only difficult in cases of smaller ovarian cysts which are adherent in the true pelvis owing to perimetritic action, or are incarcerated, or have developed between the folds of the broad ligament (Fig. 100). In the first two conditions the differential diagnosis has to be made from perimetritic exudation, hæmatocele, extra-uterine pregnancy, retroflexion of the gravid uterus, incarcerated or ingrown myoma; and in the latter case, from parametritic exudation, hæmatoma, hæmatometra lateralis, tumours of the tubes, intra-ligamentary myoma and par-ovarian cysts. The physical signs can be, as is seen in the consequent laparotomy, quite correctly made out, but the interpretation of them is often erroneous. As soon as an ovarian cyst rises into the false pelvis it can be grasped from outside, if the parietes be not too tense, like the pregnant uterus, and can be felt as an elastic or fluctuating swelling, which is limited at the sides and above, and projects out of the pelvis. When the parietes are more tense, these boundaries can be found by percussion. This gives a tympanitic note over a zone at the upper limit of the tumour and in the flanks, even in colossal tumours, which reach to the borders of the ribs. By this means one can distinguish ovarian tumours from simple ascites, and also from large liver and splenic swellings, for these latter, apart from their moving up and

down in respiration with the diaphragm, give a zone of tympanitic resonance between their lower margin and the symphysis pubis.

From renal tumours an ovarian cyst is, as a rule, distinguished by the fact that in the former the colon is in front, while in the latter it lies behind the tumours. The following have been mistaken for ovarian tumours:—The distended bladder, faecal accumulations, tympanites and phantom tumours, fibro-miomata, especially those of a cystic nature, pregnancy, retro-peritoneal swellings (malignant growths, hydatids, lymphatic and pancreatic cysts), tumours of the omentum and mesentery, encysted hydrops peritonei, free hydatids of the peritoneum, and desmoids of the abdominal walls. Some of these erroneous diagnoses have very little importance nowadays, since one removes other tumours as well as ovarian cysts by laparotomy, or obtains permanent relief by the exploratory incision, as in tubercular peritonitis and ascites of unknown origin.

Tapping, which played such a leading part in doubtful cases formerly, is entirely discarded by Gusserow. If it is not done with the most stringent antiseptic precautions the tumour may suppurate. The formation of adhesions is unavoidable, and thus subsequent operation is rendered more difficult and the prognosis less favourable, and in malignant tumours the spread of the malignant growths on the peritoneum is rendered possible by the tapping, or fatal peritonitis is set up by the escape of infectious contents (as in dermoids or suppurating cysts). When, therefore, in spite of full examination and observation of a case of abdominal tumour, the diagnosis remains undecided, one should make an exploratory incision with every precaution as for ovariectomy, and be prepared, according to the turn of events, either to extirpate the tumour or to close the peritoneal cavity again.

The diagnosis of twisting of the pedicle or rupture of an ovarian tumour is rendered very probable by the peritonitic symptoms (fever, distension and tenderness of the belly, vomiting, etc.); similarly in malignant degeneration

by the quick growth, ascites, and cachexia. The procedure of examination in enlargement of the abdomen consists first in emptying the bladder with a good male catheter, then the kind of distension of the abdomen is established by inspection, whether the abdomen is pushed forward like a ball in the middle line (ovarian tumour), or is flattened in the middle and hangs over at the sides (ascites), or whether one side is pushed forward more than the other. Measurements are taken of the circumference of the belly and the distance between the symphysis pubis and the xiphoid cartilage. A glance at the general condition will now inform us as to emaciation, cachectic appearance, œdema, or dyspnœa. If the examination is carried out under anæsthesia, a careful investigation of the condition of the heart and lungs should be previously made. The anæsthesia not only renders a complete examination easier, but also has a direct diagnostic value, because the abdominal enlargement produced by tympanites or phantom tumours disappears under its use. Palpation follows inspection.

By means of this one can determine the limits, and thus the shape and origin, of a tumour with greater certainty, unless the walls are too tense (anæsthesia), or the tumour is so large that it fills up the entire abdominal cavity. Palpation will also determine the mobility, the consistence (fluctuation), and the tenderness of a tumour. Where palpation fails, percussion will often succeed (see p. 210). Percussion should be performed with the patient both in the dorsal and the lateral positions, for in this way a change of tone is found in ascites, since the highest part of the abdomen for the time being is tympanitic. The uterus is then examined per vaginam and bi-manually. This is often possible only by the aid of the special methods before described, and thus its position, size, shape, and mobility are established. Then one determines whether a tumour is to be felt anywhere in the pelvis, whether this is identical with the one felt from above, and what the relation of the tumour is to the uterus—that is,

whether it is united to the uterus by a pedicle (broad or narrow, long or short), and whether it moves free of the uterus or only with the latter.

The **prognosis** of a true ovarian cyst is very grave. It leads certainly to death in one of the various ways already described.

The **treatment** consists in extirpation of the tumour by laparotomy-ovariotomy. There is only one contra-indication—namely, when the patient suffers from other affections which would certainly cause death in a little time (as advanced phthisis). Symptomatic treatment—the most important of which is tapping—can only be justified when the patient refuses operation. The operation should be undertaken at once as soon as the tumour is diagnosed with certainty. By this rule now and then a simple cyst of the corpus luteum or a hydrops folliculi will be operated upon unnecessarily, but even this is better than allowing an originally benign ovarian tumour, as a result of too long delay, to become malignant, or to form adhesions, or to rupture, or become twisted.

Moreover, small ovarian tumours can be comfortably removed by vaginal laparotomy (p. 54). The largest cyst removed by the author in this way was as big as a child's head. The mortality of ovariectomy is only about 5 per cent at the present day, and will go down still further by the more extended practice of early operation and of vaginal ovariectomy (For the description of ovariotomy, see page 45).

Solid New Growths of the Ovary.

To these belong fibroma, sarcoma, papilloma, and carcinoma. With the exception of fibroma all these are of a malignant nature. Fibroma is seldom diagnosed before the operation, because its distinction from dermoid of the ovary or a sub-serous pediculated myoma is very difficult. The malignant tumours grow quickly—the

follicles are destroyed very early—but they do not nearly reach the size of cystomata, and they retain the original shape of the ovary. They cause marked ascites, and are often double-sided. Not infrequently the tumour cannot be fully extirpated in these cases. In such cases most operators decline any interference after they have once learned the position of things from an exploratory incision. Papilloma is distinguished from the cystoma



FIG. 116.—Papilloma Ovarii, extirpated by Gusserow.

At the points of the ligatures is seen the short pedicle connecting the tumour with the right uterine horn.

proliferum papillare in that papillæ arise primarily from the surface of the ovary (Fig. 116). The first case of this kind was described by Eberth and Gusserow.

Parovarian Cysts.

Both in their clinical and therapeutical relationship these cysts belong to the ovarian tumours, since they are often taken for ovarian cysts, and also because the best treatment consists in their extirpation. They arise from the tubules of the parovarium, and are lined with ciliated

epithelium. They have limpid contents of very low sp. gr. (1002-1006), but cysts do occur which by their contents and their rapid growth approach closely to those of the ovary. Whether these really always arise from parovarium alone is still questionable. Parovarian cysts may be cured by tapping, but return is frequent. They may become as big as ovarian cysts, and malignant degeneration has been observed in them. For this reason laparotomy is recommended at once on the diagnosis of a parovarian cyst.

The **diagnosis** is based on their intra-ligamentary position, and the uncommonly marked fluctuation which they exhibit. Anatomically these cysts are peculiar, in that they can be easily shelled out of the broad ligament and then extirpated, whilst the tubes and ovaries are left behind. A kind of pedicle is often formed out of the broad ligament, which can be simply ligatured as in ovarian cysts.

DISEASES OF THE UTERINE APPENDAGES.

DISEASES OF THE FALLOPIAN TUBES.

Hæmato-salpinx.

HÆMATO-SALPINX arises in genital atresia from retention of the collected blood (p. 86), also from torsion or unskilful massage of a diseased tube. Hæmato-salpinx is caused most commonly by tubal pregnancy. As a result of death of the fœtus, blood effusion into the membranes takes place, the placental site becomes separated, and blood escapes into the free lumen of the tube. If the ostium abdominale is now glued up or stenosed, the blood collects in the tube and may finally lead to rupture of the tube. In other cases it may be gradually inspissated and absorbed.

The symptoms of hæmato-salpinx from genital atresia are put in the background by distension of the uterus with the collected blood. This is also the case in both the other forms.

The hæmato-salpinx of tubal pregnancy is characterised by symptoms of the latter. After menstruation has ceased once or twice, and presumptive signs of pregnancy have been present, smart colicky attacks of pain come on, and with these long-continued metrorrhagia often appears. On examination a longish, retort-shaped, hard, tender tumour is found passing laterally from the uterine horn and hardly movable.

The prognosis of hæmato-salpinx is generally favourable, since absorption is the rule. But the constitution may

suffer badly from the hæmorrhage, which often continues in spite of everything, and the pains which are caused by a secondary adhesive perisalpingitis. Rupture of the tube leads to fatal bleeding or to peritonitis.

Treatment is antiphlogistic at first, then absorptive. Ergot or hydrastis is given for the bleeding, which is especially common with tumours of the adnexa, and which is caused by venous obstruction.

Salpingoëctomy by the vaginal laparotomy of the author is only indicated if absorption takes months; and troubles of such a kind arise from the tumour that the patient's enjoyment of life and occupation appear gravely limited, and she desires a rapid cure.

With symptoms of internal hæmorrhage endangering life, laparotomy must be performed at once, and in this case ether, in the author's opinion, should be used as the anæsthetic (see Appendix on Intra-abdominal Hæmorrhage and Extra-uterine Pregnancy).

Salpingitis.

THIS is usually caused by infection, and indeed, as a rule, by extension of an inflammatory process from the uterus to the tube. Streptococci, gonococci, tubercle bacilli, and the ray fungus have been found as causes of the inflammation. Salpingitis most commonly follows puerperal diseases and gonorrhœa, which is conducted either by way of the mucous membrane or the lymphatics. Hegar says that tuberculosis of the tubes may be a primary disease. According to Ortmann, salpingitis is divided into catarrhal and purulent. In the first the epithelium may be preserved, but the mucous membrane shows small-celled infiltration, which may invade the wall of the tube itself, and in this way, as also by later connective-tissue formation, the wall of the tube becomes thickened. The thickening of the wall of the tube may also, as Kaltenbach has shown, take place from

muscular hypertrophy. Unless the discharges can escape they form hydro- and hæmato-salpinx. Purulent salpingitis under the same conditions leads to pyo-salpinx. In this way the epithelium of the tube is always destroyed, and the small-celled infiltration and the purulent softening implicates the tube wall. Through the escape of catarrhal secretion or pus into the peritoneal cavity fatal peritonitis¹ occasionally may occur, more frequently perimetritic adhesions between the ostium of the tube and the ovary, or gluing together of the peritoneal surfaces of the fimbriæ takes place, and thus the ostium abdominale of the tube becomes occluded. The secretion of the tube now gathers near the occlusion and a swelling forms, which grows gradually larger, and continually gets nearer the uterine ostium of the tube, unless other perimetritic bands and cords have compressed the tube in its course. In this way the gathered catarrhal secretion may finally escape (*Hydrops tubæ profluens*); it is possible even in pyo-salpinx that this may take place, and a spontaneous cure result.

Symptoms.—The whole character of the disease in salpingitis is governed by the coexistent perimetritis; so long as this is still absent there may be pains, but these are easily explained by the uterine inflammation. One can first lay part of the belly symptoms to the account of salpingitis, when on bi-manual examination the tubes are felt as thickened tender cords, which spring high up from the uterine cornua and end free in the pelvis laterally or posteriorly—not as peri- or parametritic fibrous bands going straight into the pelvic wall—and when no perisalpingitis or peri-oophoritis or oophoritis can be made out. As soon as these limited peritoneal inflammations set in we get severe and often cramping pains, which increase markedly during the periods, when menstruation is profuse. On examination those signs are found which establish the diagnosis of “tubal sac.” Frequently, on both sides,

¹ According to Wertheim gonococci can excite a typical peritonitis without the aid of other bacteria or mixed infection.

long smooth sausage or retort-shaped tumours are felt, which, arising by a slender stalk from the fundus uteri, terminate in thick clubbed swellings. These often extend backwards into the pouch of Douglas, and are fixed there (see Fig. 117). On each tumour itself depressions and elevations can be felt, and intimately united with it the ovary. The tumour is nearly as sensitive to pressure as a chronically inflamed ovary; it possesses a very limited mobility, in which the uterus joins. Exceptionally tubal sacs may be so large that they partake of all the characters of an intra-ligamentary ovarian cyst, and excite severe pressure symptoms. With tuberculosis the troubles from the diseased tubes may be very slight. In one case the author found merely the characteristic tubal tumour and some irregular hæmorrhage which was stopped by curetting. Pain was entirely absent. Hereditary troubles and night sweats coming on afterwards, enabled the diagnosis of tuberculosis to be made instead of the first one of pyo-salpinx, and this was confirmed by the laparotomy. The patient is progressing well.

Prognosis.—Simple salpingitis is unfavourable since hydro- or pyo-salpinx occurs so frequently. These form an unceasing source of perimetritic inflammations, which undermine the general wellbeing of the patient and her capacity for work. By bursting of the pyo-salpinx a fatal peritonitis can undoubtedly be caused. Sterility is generally present in double-sided disease, and always in double tubal occlusion.

Treatment consists in absolute rest in bed during the first stage of the disease in simple salpingitis, with which gonorrhœal colpitis and endometritis are usually associated. To ensure the escape of the discharge, vaginal douches and uterine douches, when there is but little tenderness, are used. Warm wet packs and baths are further suitable additions to treatment. Even in pyo-salpinx a marked lessening or even a complete disappearance of pain may be obtained by rest in bed, interdiction of coitus, and the use of wet packs and baths, and above all by the ichthyol

treatment (p. 204), so that hospital patients consider themselves cured after a brief stay in the hospital. As soon, however, as they resume their usual occupations, the old trouble is back in all its force. In patients who are workers, the only sure treatment for pyo-salpinx is extirpation of the uterine appendages.

Those patients, however, who are in a position to take their ease during the whole course of the disease, to rest in bed, and to visit baths, etc., often pass a painful existence, and may in the end become cured by the inspissation or discharge of the pus into the uterus.

In milder cases, where we have to deal with chronic salpingitis without closure of the tube, where most likely there is still some chronic oophoritis and circumscribed adhesive peritonitis, the conditions for recovery are more favourable. The troubles commonly quite disappear with ichthyol treatment, massage, or removal of the endometritis. The latter must be preceded by careful antiseptic uterine douching. If this is borne well we may pass to caustics, and then to curetting, but one should be on the alert for an exacerbation of the inflammation.

With pyo-salpinx the local treatment of the uterus is strongly contra-indicated, since if the uterus is dragged down the sac may burst and cause fatal peritonitis. Here only immediate laparotomy can save the patient. Early laparotomy is indicated in tuberculosis of the tube.

The difficulty of salpingotomy lies in the presence of perimetritic adhesions fixing the tube, the danger is that of bursting of the sac. The latter is generally unavoidable, because the same perimetritic adhesions which fix the tube also help to keep it closed. When the adhesion is freed the closure of the ostium is also broken down, or pus sacs are opened which have arisen by escape of pus from the tube and subsequent encapsulation of the pus. As Gusserow has shown, the pus in many very old cases becomes non-infectious, but this is not to be depended upon with certainty.

The attention of the assistant must be always directed to the bursting of the sac in salpingotomy, so that he may at once sponge up all the pus if possible.

In such cases, and especially with larger tumours, it may be good to aspirate the pus after Winter's suggestion, and to inject an antiseptic solution into the emptied sac. In cases where there are encapsulated collections of pus together with the pyo-salpinx, or when the pyo-salpinx has already opened into the bowel, the author uses drainage into the vagina with iodoform gauze. A pair of dressing forceps are thrust from Douglas's pouch into the posterior fornix, and the retro-uterine space is tamponaded from above.

By suturing together the infundibulo-pelvic ligaments and the rectum to the uterus, the pelvic cavity may be cut off entirely from the abdominal cavity. The strips are removed in three to seven days through the vagina. The author has entirely given up drainage through the abdominal wound. Abscesses of the abdominal wall easily arise from this, and the author has had a case of ileus which was luckily cured by reopening, also a parietal fistula which finally penetrated the bowel, and was only cured after many operations, including a resection of the bowel.

Even after successful salpingo-oophorectomy troubles often remain, such as abdominal and sacral pain, pain on defæcation and cohabitation: these depend upon tenderness of the stump scar left in the ligament by the operation. These scars remain tender as long as any *endometritis* is present, even when any infectious germs in the tube stumps have been destroyed with Paquelin's cautery. In order to cure the endometritis, the author has combined curetting with the laparotomy in the last few years, but even then caustic applications have to be made for months in many cases on account of the long duration of these troubles. In a case thus treated a fresh gonorrhoeal attack came on a year after the full recovery, and led to symptoms of peritoneal irritation.

These considerations have caused Pean to remove the

diseased uterus, the true *causa peccans*, per vaginam (castratio uterina); Segond has added the removal of the diseased adnexa with the uterus. The latter method has found a warm supporter in Landau for cases of complicated pelvic suppuration. The author has also used this method in many cases where the patient dreaded laparotomy, and he can only say that with successful extirpation the patient is at once cured. But the vaginal procedure, when it includes removal of the uterus, is more severe—the author fears especially embolism as a result of thrombosis in the uterine plexus of veins—and it must happen in odd cases, as it did to the author, that after vaginal extirpation of the uterus one has to do laparotomy in order to get the adnexa away.

Vaginal salpingo-oophorectomy may be considered as a new method of removing diseased tubes. The author has used it with success even with pyo-salpinx. The patient was able to leave the clinic on the ninth day. The *technique* of salpingo-oophorectomy resembles that of castration (pp. 42, 202). If the ovaries are relatively sound, one should leave them, or at any rate a portion of them behind, in order to retain the sexual character and menstruation of the patient.

In **resection** of the ovaries, first described by Schröder, one can either suture up the ovary itself after incision, or, as in salpingo-oophorectomy, the whole broad ligament from the horn of the uterus to the infundibulo pelvic ligament may be tied so as not to carry the line of separation through the mesovarium, but through the ovary itself. This conservative surgery, of late much used by A. Martin, has been extended to the tubes themselves by A. Martin, Skutsch, and Polk, by making a hole in the side of the tube in hydro-salpinx and stitching all round it (salpingostomy).

A. Martin has seen normal pregnancy after salpingostomy. The author has performed the operation many times, and twice by vaginal laparotomy, but has not seen pregnancy after it. The author is not pleased with the

conservative treatment of tubal sacs by vaginal puncture or incision after Landau's method, because of the uncertainty of the procedure.

New Growths of the Fallopian Tubes.

These arise very rarely. Carcinoma and sarcoma are the only new growths which develop within the tube, and transform the tube itself into a tumour. These swellings mostly arise from primary ovarian cancer or sarcoma, and in the tube are secondary growths. Yet of late many primary growths of this kind have been described which were obtained by salpingotomy (Gottschalk, Senger, Doran, Kaltenbach, Ortman).

Perimetritis or Pelvic Peritonitis.

Perimetritis is the term applied to inflammation of that part of the peritoneum which covers the pelvic organs. All authors agree in distinguishing an infectious and a non-infectious form of perimetritis. The infectious form of perimetritis is caused by septic or gonorrhœal infection. Septic infection is produced by wounds, and thus arises spontaneously in labour, and in addition to the puerperium from surgical interference, while gonorrhœal infection usually arises from coitus with a man suffering from gleet, whose gonorrhœa has perhaps been for many years in a chronic form.¹ The inflammation spreads either by the mucous membrane or through the lymphatics to the pelvic peritoneum. Since gonorrhœa spares no section of the genital tract, we find it is the chief cause of perimetritis, which is the most wearisome and the most difficult to treat of all gynæcological diseases. As the number of men suffering from gonorrhœa is very great, the correspond-

¹ [Pyo-salpinx is found occasionally in intact virgins. This may be due to an old gonorrhœa acquired in childhood by accidental contact with gonorrhœal discharge—J. W. T.]

ing gonorrhœal perimetritis in women is a very common disease.

Noegerath deserves the credit of having pointed out the importance of latent gonorrhœa in the male as the cause of grave gynæcological disease. As a rule the beginning of the disease, which is finally seen by the gynæcologist in the form of perimetritis, can be traced back in married women to early married life, when the disease commenced with bladder troubles and great discharge; this gradually led on to the involvement of the whole genital tract, and finally to permanent invalidism and sterility.

In one-third of barren marriages the man is to blame for the sterility (Kehrer).

The cause of all the inflammatory diseases which arise from gonorrhœa is not simply the gonococcus, but, as Bumm has shown, other cocci for which the gonococcus paves the way for entrance and multiplication (mixed infection). Yet gonococci alone can set up typical peritonitis according to Wertheim. The cause of septic perimetritis is the streptococcus pyogenes.

Septic perimetritis differs from septic peritonitis in that it is localised by the gluing together of the bowels covering in the pelvis. Hence, on section, one finds the pouch of Douglas closed in by the cohesed loops of bowel. In the space thus formed a fluid exudation is found which may be serous, fibrinous, purulent, or foul in character. The serous or fibrinous exudation may become inspissated and finally absorbed, or lead to adhesion and dislocation of the uterus and appendages, or it may suppurate; the purulent and foul exudations produce death by pyæmia or ptomaine intoxication, unless the strength of the patient can carry her on until spontaneous bursting of the abscesses or their opening by the surgeon.

Bursting occurs most commonly into the large intestines, less often through the abdominal parietes, or into the bladder and vagina.

If perimetritic exudations remain stationary for months

or years or relapse easily, so that fresh febrile attacks and finally spontaneous rupture takes place, the cause from the author's experience lies in the presence of purulent tubal catarrh or in ovarian abscesses.

In gonorrhœal perimetritis the chief seat of the disease is in the region of the tubes and ovaries, and generally at the sides of the uterus. Perimetritic membranes, between which pus can lie, enclose the diseased tubes and ovaries.

Non-infectious perimetritis is characterised solely by formation of adhesions and cohesions between adjacent peritoneal surfaces. The same kind of vascular adhesions



FIG. 117.—Specimen from a woman aged 66, who had had a child about 25 years before. (After Brandt.)

A chain of inflammatory residua runs from the cervix outwards through the parametric tissues (Pa) and broad ligaments to the tubes and ovaries, and from thence to the large intestine. Both ovaries are diseased, and the Fallopian tubes are occluded at their abdominal ostia.

arise in retroflexion of the uterus and prolapse of the ovaries, in ovarian cysts and myomata, and from escape of cyst contents and blood.

The **symptoms** of septic perimetritis are those of local peritonitis. They consist of great pain in the abdomen, distension, high fever, and vomiting. If the exudation is completely absorbed all the symptoms disappear, but if the exudation remains long in a stationary condition more or less severe pain, pressure symptoms, obstipation of the

bowel, and bladder troubles continue. If adhesions are left behind, displacement and secondary diseases of the uterus, ovaries, and tubes take place. In this way fresh perimetritic irritation is set up—a vicious circle which explains the difficulty of curing perimetritis (Fig. 117). Should the exudation become purulent or decomposed, the fever comes on anew, with specially high evening temperatures.

The result is that, unless spontaneous bursting or incision come to the rescue, death ensues, or gradual inspissation and absorption of the pus takes place. Even after bursting, death may take place from prolonged supuration. These cases are often difficult to grapple with therapeutically.

Gonorrhœal perimetritis is chronic from the first, and is characterised by the most varied kinds of pain in the belly, which become intense at the menstrual periods, on straining, defæcation, and cohabitation. The gonorrhœal origin of perimetritis is rendered very probable by the presence of a tubal sac, and is made certain when other evidence of gonorrhœa is obtained from the history.

Non-infectious perimetritis excites symptoms only by causing displacement of the pelvic organs. If endometritis, due to congestion of the displaced uterus, arises, this keeps up a constant tenderness of the perimetritic bands, which makes itself felt in every movement of the patient and on defæcation and cohabitation.

Diagnosis.—A perimetritic exudation is distinguished by its completely filling up the space between the posterior pelvic wall and the uterus. It runs right into both the posterior pelvic wall and the back of the uterus; it is immovable itself, and also fixes the uterus. It depresses the posterior vaginal fornix, and pushes the uterus forwards. The upper limit is only to be made out indefinitely, since it is formed by the adherent coils of intestine.

Retro-uterine hæmatocele has just the same physical signs (see Fig. 120), but in contradistinction to perimetritic

exudation the former begins without fever. Recent exudations are very tender on pressure.

Perimetritic adhesions are recognised, in the first place, by the fixation of the uterus, tubes, and ovaries, organs which normally are movable. The bi-manual examination, both by the vaginal and rectal methods, under anæsthesia if necessary, enables us to make out fairly well the kind of adhesions and their extent. This method of examination was worked out by B. S. Schultze.

The prognosis of perimetritis is unfavourable; still in most cases the discomforts can be removed by rational treatment. In gonorrhœal perimetritis, however, this can generally only be done by rendering the patient sterile, an operation whose mortality even yet is 5-10 per cent. But that this mortality can be lowered has been proved by Zweifel, who had only 1 death out of 134 salpingotomies (0·7 per cent).

Treatment.—In recent exudations absolute rest in bed is indicated at once. Opium and the application of ice bags are additional aids when severe peritonitic symptoms are present. When the symptoms are less severe the surgeon obtains a copious evacuation of the bowels by giving calomel at once. If the fever and pain subside, warm fomentations are used. Fourteen days after the disappearance of fever hot douches can be begun, the temperature of which should be rather low (45° C.) at first. More useful from the very beginning of the disease is ichthyol treatment in the form of pills and painting the abdomen with a 50 per cent glycerine solution of ichthyol. Even pus which lies encapsuled between the bowels may be absorbed by this treatment. When the patient has somewhat regained her strength she may be allowed to use baths (brine or mud). With this treatment, and often with nothing more than simple rest in bed, large exudations disappear without leaving a trace. If the exudation becomes purulent or decomposed it should be incised early. As a rule, the opening is made in the posterior vaginal fornix, and this is stitched to the sac wall, the sac is then

plugged with iodoform gauze. But if, owing to the high position of the abscess, it cannot be reached per vaginam, then it should be opened from the belly wall in case it be adherent there.

If not adherent there, the opening of the abscess in two stages is recommended. By plugging the abdominal incision with iodoform gauze the wound and the exposed part of the abscess wall become shut off from the general peritoneal cavity, and then the abscess can be opened without any of the pus getting into the peritoneal cavity.

The extirpation of a pyo-salpinx must be thought of in treating gonorrhœal perimetritis, and likewise in septic relapsing perimetritis. When perimetritic adhesions contain blood-vessels, simple absorption of the adhesions is not to be expected from the use of the absorbents already mentioned. This absorptive treatment can only produce a relaxation of the adhesions by means of which the displaced organs somewhat regain their mobility. Then by the movements which, for instance, the uterus regularly undergoes in the varying conditions of fulness of the bladder and rectum, the adhesions become stretched, and finally separated—an occurrence which can be much aided by Hegar's plan of injecting voluminous enemata. The stretching, and finally the separation, of the adhesions is attained with much more certainty in two ways—namely, by the method of B. S. Schultze, described above on page 204; and by massage, according to the method of Thure Brandt. It is only natural that both methods can do grave injury in the hands of the inexperienced; but this objection can be made against every operation. A preliminary necessity for the carrying out of both methods is practice in gynæcological examination. When the first method fails, the desired effect is often obtained with the second, if any endometritis present has been previously remedied by curetting. Endometritis keeps up a lasting tenderness of the perimetritic bands, which does not allow of their being stretched. The

essence of massage consists in the possibility of a sufficient palpation of the fixing bands and of the organs fixed. The latter are then pulled in the opposite direction to that in which they are fixed. When the posterior uterine wall is fixed, two fingers are passed as high as possible up the posterior cervical wall, and together with the external hand, passed as far as possible over the posterior surface of the uterus, the uterus is pulled forwards two or three times at a sitting, and is held for some time in strong ante-position. Fixed ovaries are freed by gradual circular scraping of the ovary out of its posterior adhesions, and these adhesions are then stretched or torn by drawing the ovary forward. In gonorrhœal perimetritis these methods can only be used in chronic cases where there is no pyosalpinx. For this ichthyol treatment is good. Massage acts equally well in old dense exudations, even when the other means of treatment have been used in vain. In exudations which have already partly suppurated and burst, massage must be applied very circumspectly. If the perimetritic adhesions are combined with retroflexion, intra-peritoneal vaginal fixation is indicated (p. 142). The adhesions are divided upon a director with Paquelin's cautery. Laparotomy may be necessary in cases of perimetritic adhesions or strands which have caused a narrowing or mal-position of the lumen of the bowel. The author operated for this indication in a case which had twice previously been subjected to laparotomy, with removal of the appendages. After massage for years had only produced temporary relief at intervals, the author performed laparotomy for the third time, with the diagnosis of "adhesion of the bowels to the uterus, and of the omentum to the wound scar." He found the uterus adherent to the bowels laterally and behind. It was set free from the adhesions, and extirpated completely—abdominally. The patient has made a complete recovery. This ileus comes on most commonly in connection with laparotomies. Laparotomy for non-gonorrhœal perimetritis and removal of the diseased ovaries, or the simple

division of adhesions, is not, in the author's opinion, justified until the two methods of treatment given before have been tried and found useless (see p. 204). Here also ventral may often be replaced by vaginal laparotomy.

Parametritis.

Parametritis is inflammation of the connective tissue lying under the peritoneum. This lies chiefly in largish masses laterally between the folds of the broad ligament, whilst there is but little connective tissue in front of and behind the uterus. The inflammation, therefore, at the sides of the uterus is most extensive—true parametritis—yet anterior parametritis, inflammation of the connective tissue lying between the bladder and the uterus, and posterior parametritis, inflammation of the connective tissue in the folds of Douglas, play an important part, especially in the ætiology of the displacements of the uterus. Since the peritoneum rises out of the pelvis on every side it is evident that an inflammation of the connective tissue lying underneath the peritoneum, which begins in the pelvis, can extend to the region of the kidneys behind, to the iliac fossæ laterally, and upon the parietes over Poupart's ligaments in front. Parametritis is a cellulitis which arises from an infected wound. It arises most commonly during the puerperium, also from operative measures, in connection with uterine catarrh (B. S. Schultze) and gonorrhœa (through mixed infection). In the puerperium especially the inflammation may extend to the perimetrium, and even cause general peritonitis of a fatal character (*Erysipelas malignum internum* of Virchow).

A parametritis chronica atrophica diffusa has also been described by W. A. Freund, which is caused by excessive sexual irritation, bad nutrition, and loss by discharges, etc. This passes into advanced atrophy of all the pelvic organs, and brings on a premature menopause. As a more

remote symptom we often get acute hysteria to a high degree.

The pathological anatomical condition is one of œdema and small-celled infiltrations, which forms, microscopically, a yellow, brawn-like, gelatinous mass. It terminates by complete absorption, by increase of connective tissue with consequent fibroid contraction, or by suppuration. The latter often attacks only smaller sections, and thus the disease can assume an extraordinarily chronic course, since the greater mass of the exudation is left unaltered by the discharge of the pus. A parametritic abscess opens spontaneously, most commonly above Poupart's ligament, less frequently by the ischial foramen, at the outer margin of the Quadratus lumborum, beneath Poupart's ligament, into the vagina, the bladder, or the rectum.

The first five named points are also those from which a parametritic abscess may be opened; and Hegar, and latterly Säger, have described special incisions for the opening of the ischio-rectal cavity, in which the levator ani is cut through. So far as the general conditions allow of it, a parametritic abscess should not be opened too soon, but the melting down of the exudation should be favoured by warm applications.

The symptoms which a recent parametritic exudation excites are often strikingly few. Fever, pain, and pressure symptoms are only indistinct, or continue only for a few days if the patient takes care of herself. But if she

keeps up and about pelvic pain comes on with sacral pain, and radiating pains down the legs, which make the patient feel very indisposed. If connective tissue formation takes



FIG. 118.—Left-sided parametritic exudation which displaces the uterus to the right. The short fibrous bands left after shrinking of the exudation finally brings the uterus into a left-sided displacement with dextro-torsion and anteversion. (After B. S. Schultze.)

place with subsequent shrinking, displacements of the uterus are specially apt to occur (Figs. 103 and 104).



FIG. 110.—The same as Fig. 103, but seen from above.

These introduce new features into the aspect of the disease. If endometritis arises as a result of a backward displacement, or a retroflexion of the uterus, it keeps up a lasting tenderness of the parametric fibrous bands, and this makes itself felt on every sudden movement of the patient. If suppu-

ration sets in fever comes on, with morning remissions or intermissions.

The diagnosis of parametric exudation may be made when a swelling is felt by the side of the uterus, which runs right into both uterus and the lateral pelvic wall, which is immovable, and which pushes the uterus to one side, and there fixes it. Below, the infiltration is only indefinitely limited, because it sends offshoots in various directions. The upper boundary stands out clearly in a crescent shape when the exudation has implicated the whole broad ligament. Tenderness on pressure is not marked. A parametric exudation is differentiated from a hæmatoma of the broad ligament only by the presence of fever at the commencement of the former.

Para- and perimetritic cicatricial bands can be diagnosed at once from the mere fixation of the uterus. But if one now attempt to push the uterus to the side opposite to that of fixation, the bands stand out much clearer.

Parametric cicatricial bands are to be felt easily by palpation at the side of the uterus. They stretch as a rule straight over the vaginal fornix, and from the uterus to the pelvic wall, in the base of the broad ligament. The bands between the bladder and the cervix are also easily made out through the anterior fornix. The bands

of posterior parametritis are often first made out with certainty when one draws the cervix somewhat downwards with the volsella or examines per rectum. The posterior parametritic bands are distinguished from perimetritic ones by their position and comparative freedom from tenderness to pressure. The former present two thick bands corresponding to the folds of Douglas, which, diverging from the uterus, pass backwards and outwards, while the perimetritic adhesions are usually much more numerous, and occupy the space inside the folds of Douglas. In the majority of gynæcological patients one finds para- or perimetritic bands of this kind with displacement of the genital organs (in women who have borne children, Braudt estimates this at 58·4 per cent). The prognosis of parametritis is better than that of perimetritis. The prognosis is unfavourable in those cases where an incomplete purulent softening of the exudation has taken place. Here death may finally be brought about by continuous suppuration.

The treatment of parametritis is the same as that of perimetritis with the exception of laparotomy.¹ In recent cases, when there is no great implication of the peritoneum, regular evacuation of the bowels must be attended to. Stretching of the parametritic bands can be obtained partly by bi-manual massage and partly by elastic traction on the cervix through volsella (Chrobak). Any endometritis present must be removed previously by treatment (see p. 108).

Retro-uterine Hæmatocele.

Retro-uterine hæmatocele is an encapsuled blood collection in the pouch of Douglas. The encapsulation results firstly from the bleeding taking place into a space

¹ The contraction of the folds of Douglas can be so extreme that ileus from constriction of the rectum ensues, and colotomy becomes indispensable (B. S. Schultze).

formed by perimetritic adhesions, or secondly by the blood, after a free flow into the peritoneal cavity, becoming shut in by secondary perimetritis, and into the cavity thus formed, which is already filled with blood, fresh hæmorrhages take place. The most frequent cause of the formation of hæmatocele is, according to J. Veit, the rupture of an extra-uterine pregnancy and next (S. Schröder) the bleeding from the vessels of new formed perimetritic membranes, the pelveo-peritonitis hæmorrhagica of Virchow. Bleeding may also exceptionally take place from a burst Graafian follicle, or a burst blood-cyst of the ovary, or a varicose vein of the ligamentum latum. Congestion of the genitalia, as in coitus, or from chill (especially at the time of menstruation), are predisposing causes.

Symptoms. — Perimetritic diseases have previously been present as shown by the ætiology, or menstruation has been absent. The onset of the disorder commonly coincides with the time of menstruation, or is associated with menorrhagia, and declares itself at once by symptoms of anæmia, as sudden syncope or weakness and fainting. Then pressure symptoms come on from the tumour, bearing down, sacral pain, rectal and bladder tenesmus. Fever is not present at first, and comes on secondarily if more severe irritation of the peritoneum or decomposition arises.

The **diagnosis** is made by proving the presence of the physical signs of a perimetritic exudation and by the help of the history (Fig. 120).

The **prognosis** as regards life is favourable with rational treatment, but is doubtful as regards complete recovery, since perimetritic residua are commonly left behind.

The **treatment** is at first expectant. The swelling often quickly lessens with absolute rest in bed, regulation of the bowels, the application of ice bags to the abdomen, and the use of sedatives to prevent recurrence of hæmorrhage. In other cases it remains stationary for months.

For these cases, and for marked pressure symptoms, and in cases where the social status prevents the patient waiting the necessary time for absorption or giving herself the necessary ease afterwards, Zweifel and Gusserow recommend opening the blood-cyst from the posterior vaginal fornix.

By aspirating, one makes sure of the nature of the contents of the cyst and then passes a lancet knife by

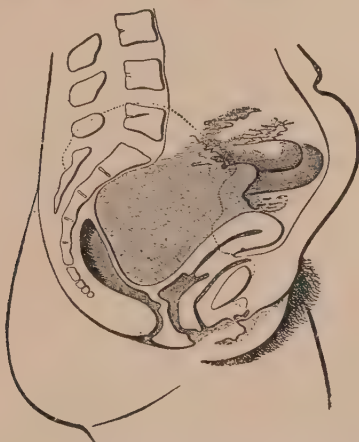


FIG. 120.—Retro-uterine Hæmatocele. (After B. S. Schultze.)

The blood-tumour has ante-placed and elevated the uterus. The roof of the hæmatocele is formed by adherent loops of intestine: its floor by the pouch of Douglas.

the side of the cannula which is left in. With some silk sutures the sac wall is united to the vaginal mucous membrane, the cavity is washed out and filled with strips of iodoform gauze. The douchings are repeated frequently. By this method a cure may be got at the latest in three weeks. If the patient refuses this minor operation, in chronic cases massage may be indicated. If tubal pregnancy has been diagnosed as the cause of the hæmatocele, then on repeated bleeding, if it leads to

anæmia dangerous to life, laparotomy is indicated. One finds in such cases either a rupture of the sac of the hæmatocele with free bleeding, or a similar hæmorrhage from the open ostium of the tube.

Hæmatoma of the Broad Ligament.

This is distinguished from retro-uterine hæmatocele by its intra-ligamentary position, and also by its origin, for it arises from incomplete rupture of the uterus in labour or as a result of rupture either of a tubal pregnancy or of a varicose vessel into the broad ligament, but it cannot arise in connection with pelveo-peritonitis. From a parametritic exudation it differs, according to Gusserow, in being limited by the anterior and posterior pelvic walls, and by possessing a certain mobility. These physical signs and the history secure the diagnosis as against that of simple exudation.

But the examination should be carried out under anæsthesia, in cases of doubtful hæmatoma of long duration, so as to exclude intra-ligamentary tumours. The latter often seem to have a firm union with the pelvic walls when examined without anæsthesia.

The symptoms are the same as in hæmatocele, and the treatment is the same. The prognosis is rather better than in hæmatocele, since the danger of decomposition from the bowel is less as the bowel is not so near, and perimetritic residua are not left behind after absorption of the escaped blood as they are in hæmatocele.

APPENDIX

On Intra-abdominal Hæmorrhage and Extra-uterine Pregnancy.

Intra-abdominal hæmorrhage in a woman is almost always due to tubal pregnancy, and needs prompt treatment.

1. The hæmorrhage may be *acute, profuse, and fatal within a few hours*, unless stopped by operation.

Then there is progressive quickening of the pulse, increasing faintness, sickness, paleness of the lips and face, with tenderness and distension of the abdomen: the mind remaining clear.

There is a history of five or six weeks' amenorrhœa followed by irregular loss which usually accompanies the abdominal hæmorrhage and pain, and is therefore present when the patient is seen.

On vaginal examination a semi-fluid mass of blood and blood-clot can be felt in the pouch of Douglas, and in some cases it is even possible to feel fluctuation of the blood either on double external or "bi-manual" palpation.

2. The hæmorrhage may be *acute, but less profuse and intermittent*. This is the more common form. A case begins with urgent symptoms of abdominal pain and faintness as described above, but in five or six hours the condition improves and the patient may even be able to get up from her bed and walk out of doors. In one, two, or three days all the symptoms recur, and again, perhaps, the hæmorrhage temporarily ceases. If such a case be examined, the enlarged tube can usually be felt as a "tubal-sac" behind the uterus, and spreading from this a mass is found occupying one side of the pelvis. The vaginal vessels beneath this mass are often

specially prominent and pulsating. At the same time, an irregular hæmorrhage from the uterus and vagina is going on, and, in the majority of cases, this has been preceded by a period of amenorrhœa of five or six weeks' standing. The uterus itself is not at all, or only very slightly, enlarged. "Where one finds a history of amenorrhœa followed by irregular loss, together with signs of a tubal tumour in a woman of child-bearing age who has been previously healthy, there is every reason to suspect that extra-uterine pregnancy has begun" (*Lancet*, Sept. 17, 1892).

The **treatment** is essentially operative. The abdomen must be opened, the uterine end of the tube and broad ligament secured by a tight ligature, and the pregnant tube removed. The statistics of operation, if done in time, are remarkably good. The writer has operated on twenty-two cases (two of these being for acute hæmorrhage of the most dangerous class), and all have been successful.—J. W. T.

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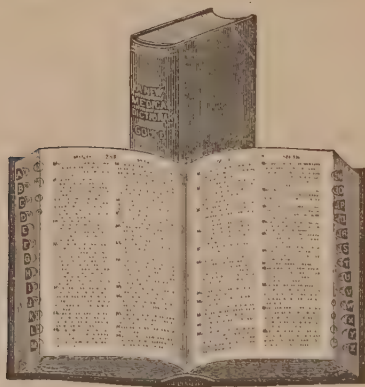
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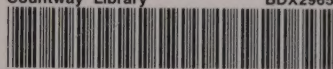


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